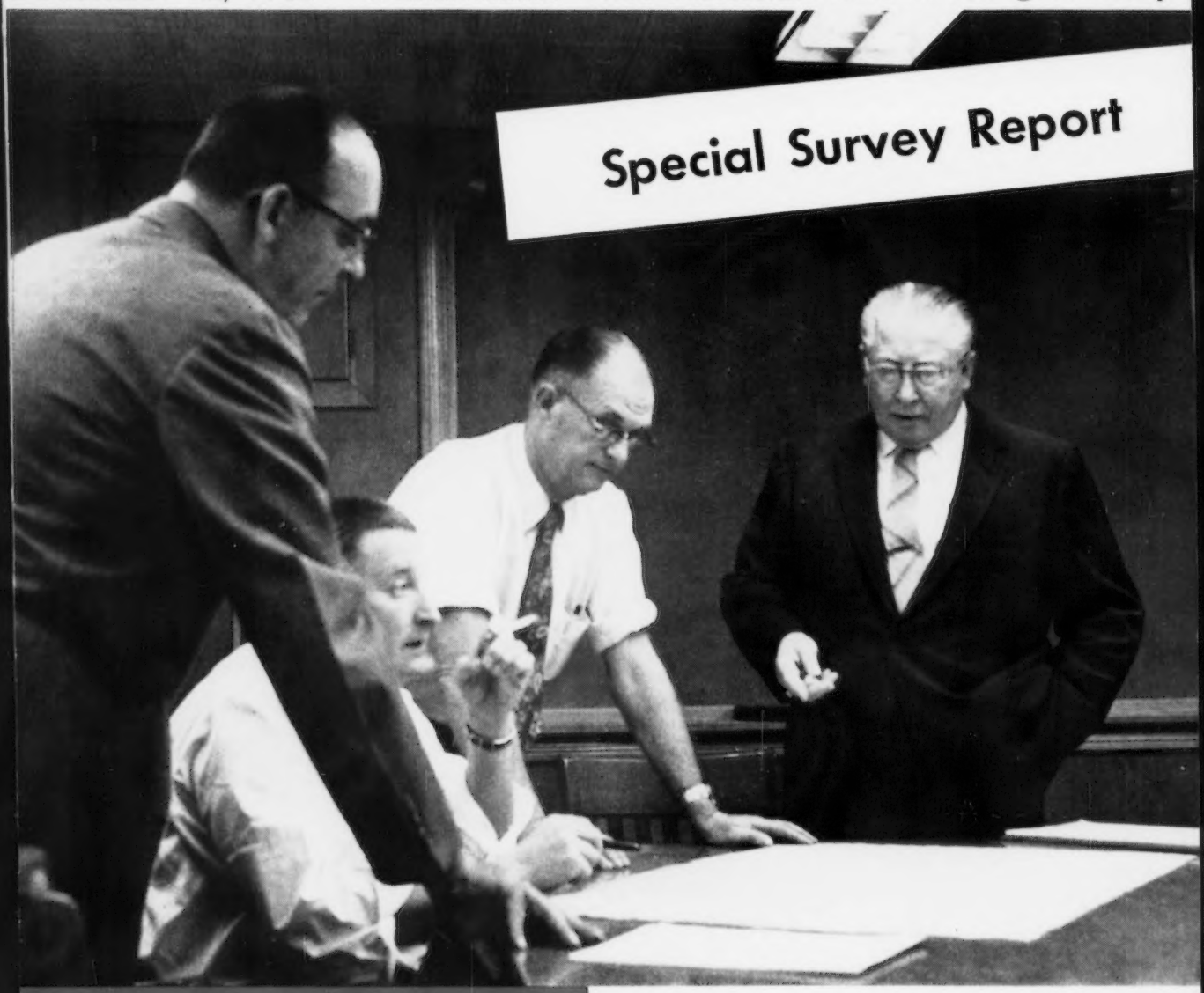
The IRON AGE
December 12, 1957 A Chilton Publication The National Metalworking Weekly



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How to Run A Cost-Cutting Program P. 97

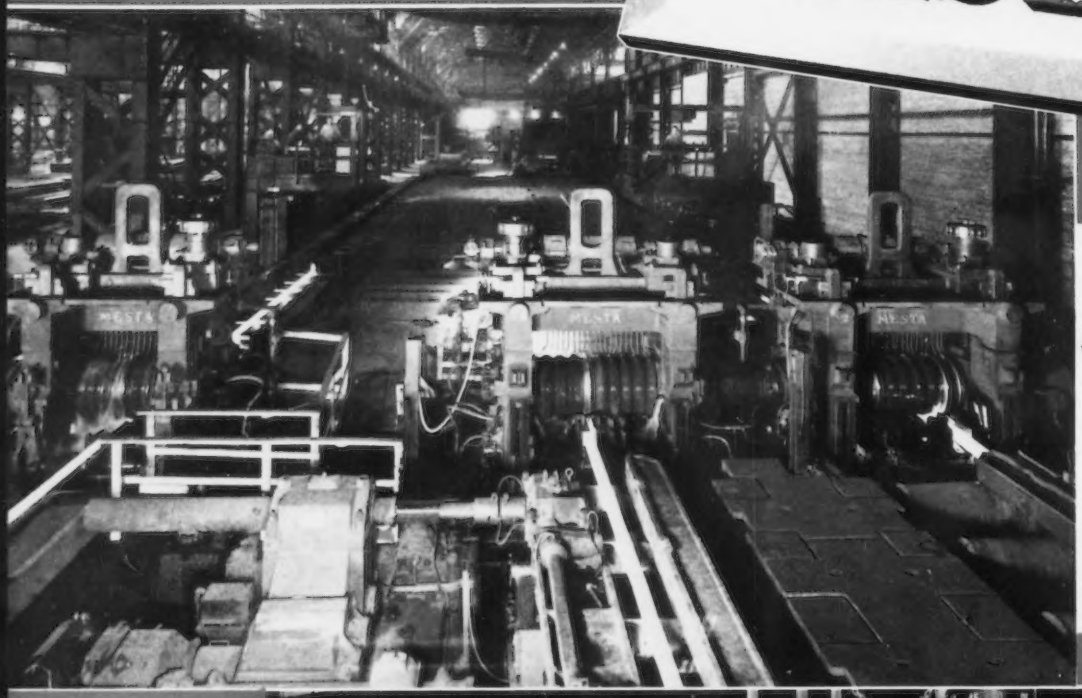
Industry Can Help Push Science Teaching – P. 83

Press-Form Tubing With Simple Die Setups – P. 127

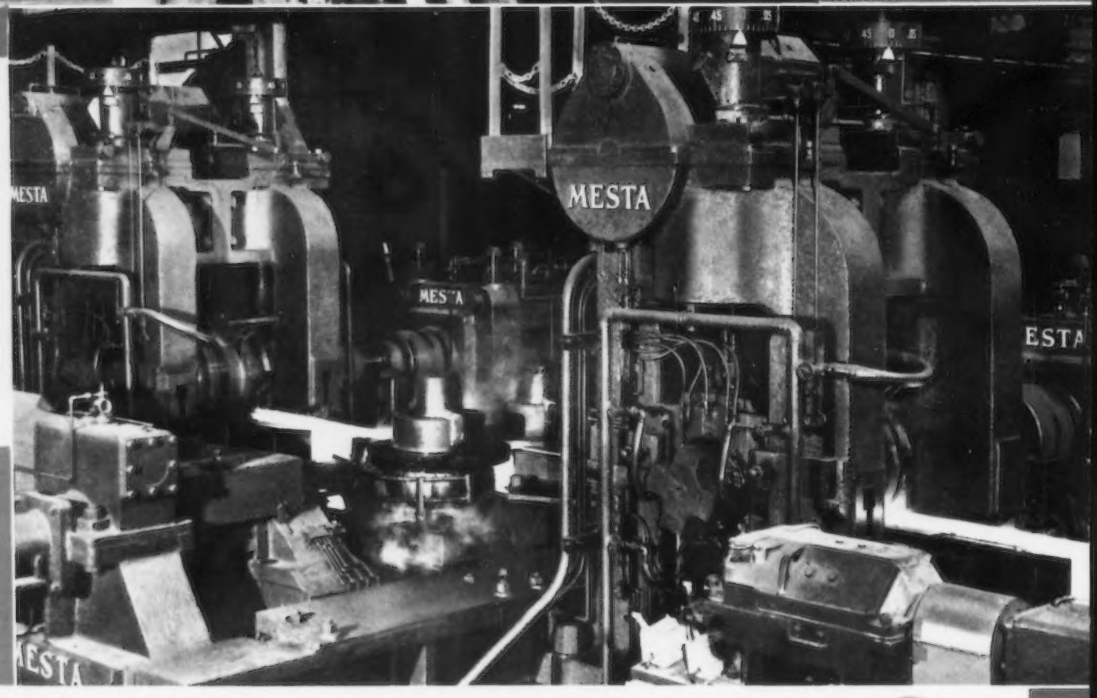
Digest of the Week P. 2-3

BAR and BILLET *Mills*

Designed and Built by MESTA



Intermediate, Leader, and Finishing Stands of a MESTA 32" Bar Mill



Two stands of a MESTA 30" Two-High Continuous Billet Mill with Vertical Edger

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Indexed in the Industrial Arts Index and the Engineering Index.

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The IRON AGE

December 12, 1957—Vol. 180, No. 24

Digest of the Week in

★Starred items are digested at right.

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AID TO EDUCATION

Industry Has Big Role — Improving our schools is important in winning the technological race with Russia. American firms, big and small, can play a vital part in the project. Here's a blueprint on the ways they can do it. P. 83

TAX-AM REVIVAL

Sought By ODM—The lagging satellite program puts fast tax writeoffs for industry in a new light. The dying law now on the books would be extended and broadened to encourage basic research. P. 85

TRENDS

Don't Bet on Them—You can only count so much on business trends. They don't necessarily follow through to all products. An analysis of "best years" shows that over all good business isn't always a guarantee. P. 95

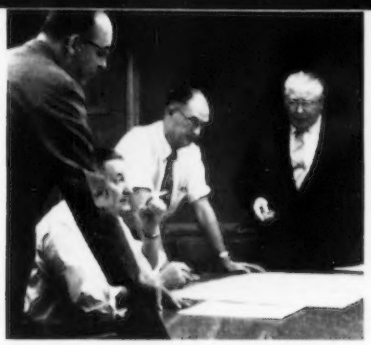
AUTO X-FRAMES

Win Designer Approval — The X-frame that Cadillac adopted last year, and that Pontiac and Chevrolet switched to this year, gives designers a lot more working room. It incorporates some of the better features of the unit body. P. 106

U. S. BUDGET

A New Record?—In theory, it's possible for Congress to cut some spending to make up for increased

Metalworking



PARING COSTS: The men on the cover are talking about cost-cutting (for their names see p. 102). Their job isn't so easy. After deciding where to start, they must determine which items are most likely to yield higher savings in less time. P. 97

defense needs. But in practice, its begining to look like the 1958 session will vote the biggest-ever peacetime budget. P. 111

TOOL PUBLICITY

It's Urgent — The American public doesn't know enough about machine tools to realize their importance, NMTBA says. A campaign is underway to educate laymen, especially younger people. P. 115

FEATURE ARTICLES

PRESS-FORM TUBING

With Simple Dies—A press or a press brake, a supply of flat blanks and some simple dies are all you need to form metal tubing. Die design not only determines how tube seam is joined throughout its length, it also permits curving or bending blanks into a variety of cross sectional forms. P. 127

JAWS UNLOAD PANELS

Efficiently, Safely — Flexible gripping devices unload automotive stampings from presses to eliminate manual handling. In some cases grippers turn the parts over "on the fly." The units adapt to many press situations. P. 130

PATTERNS AND CORES

How to Cut Costs—There are many ways to get good patterns and cores at lower cost. Skillful use of skeleton patterns and coreboxes reduces pattern costs and often cuts molding and coremaking time. Good design can simplify patterns and eliminate unnecessary core boxes or loose pieces. P. 132

WELD COPPER COILS

For Fast Production — Vacuum furnaces need water-cooling to dissipate heat radiating from the crucible. Copper cooling coils do the job, but mounting the coils on stainless steel chamber posed a problem. P. 135

FLOW COAT PAINT

For Ease and Safety—By closing the system and spraying instead of dipping, an automotive company gets savings in labor, greater safety, and a superior finish on stampings. There's an unexpected benefit in ease of cleaning the system. P. 136

MARKETS & PRICES

CARPENTER TAKES OVER

Buys Northeastern Mill—Courts and the SEC approve Carpenter Steel's $8,800,000 bid for insolvent Northeastern Steel Corp. The new owners will concentrate on producing specialty steels. P. 86

OXYGEN STEEL

J. & L. Starts Up—New basic oxygen steelmaking furnaces are operating at Jones & Laughlin's Aliquippa plant. It's a major technological step, says fourth largest steel firm. P. 87

ALUMINUM

Woos Shipbuilders—An Aluminum Co. of America naval architect heads a group working up standards for use of their metal in shipbuilding. They'll present the results in 1958. P. 88

SHIPYARDS DIVERSIFY

Non-Marine Work Wanted — Shipbuilders along the West Coast are casting a favorable eye on diversification. It's regarded as the only solution to the industry's chronic ups and downs. P. 113

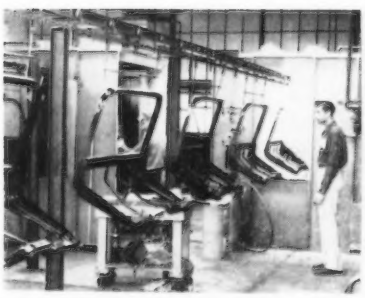
STEEL OUTPUT

Lower Than Expected—Steel output this year will be about 113.2 million ingot tons. That's a lot less than anybody had expected. But it's still the third best year in steel's history. P. 173

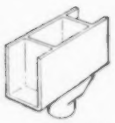
NEXT WEEK

PLANT MODERNIZING

Where Organization Counts — New equipment and a new plant do not guarantee efficiency. Often, it's material handling that is overlooked. Next week's feature article points out many ways to make modernization more effective.



Hammer or Press.....

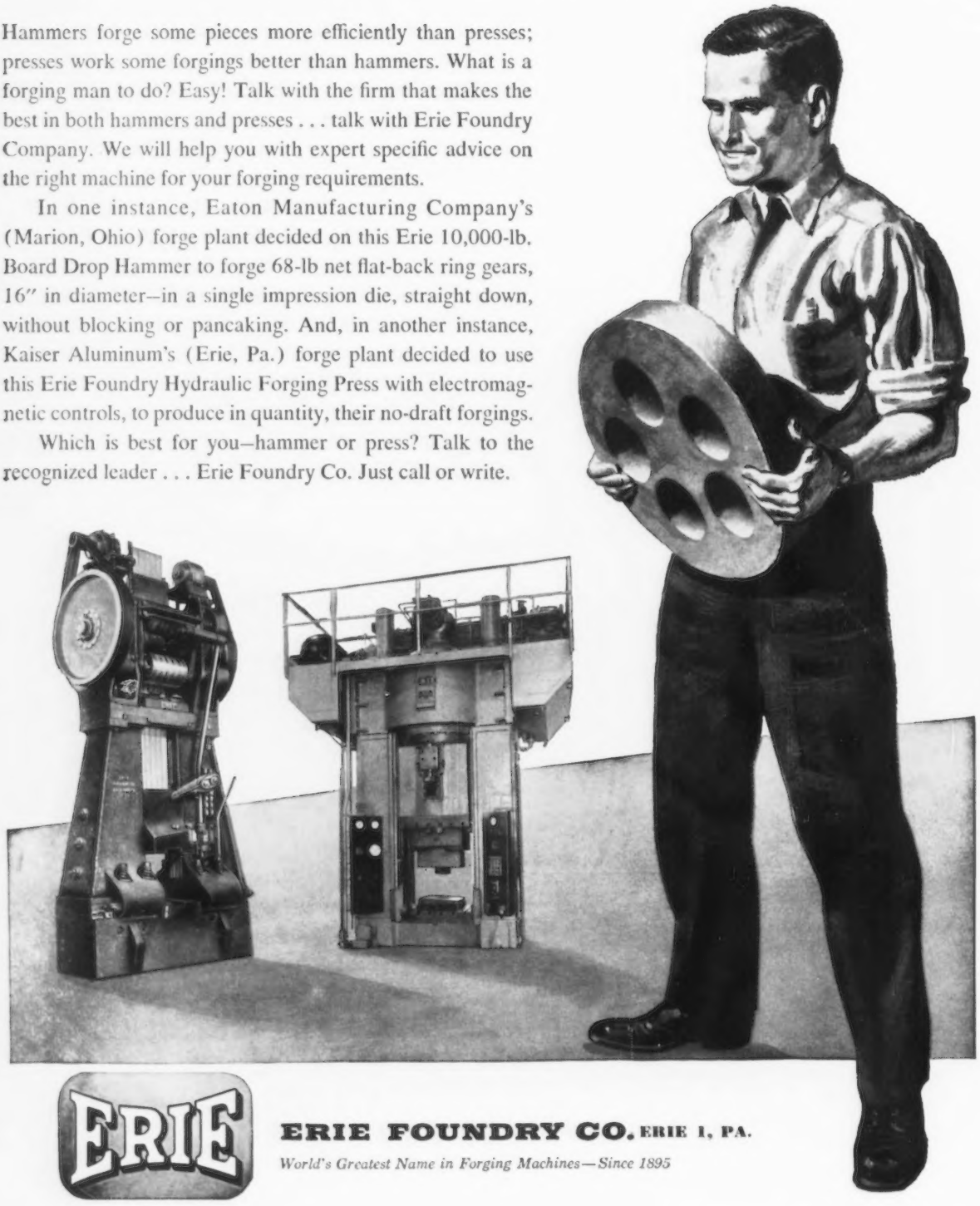


which is best for your forged product?

Hammers forge some pieces more efficiently than presses; presses work some forgings better than hammers. What is a forging man to do? Easy! Talk with the firm that makes the best in both hammers and presses . . . talk with Erie Foundry Company. We will help you with expert specific advice on the right machine for your forging requirements.

In one instance, Eaton Manufacturing Company's (Marion, Ohio) forge plant decided on this Erie 10,000-lb. Board Drop Hammer to forge 68-lb net flat-back ring gears, 16″ in diameter—in a single impression die, straight down, without blocking or pancaking. And, in another instance, Kaiser Aluminum's (Erie, Pa.) forge plant decided to use this Erie Foundry Hydraulic Forging Press with electromagnetic controls, to produce in quantity, their no-draft forgings.

Which is best for you—hammer or press? Talk to the recognized leader . . . Erie Foundry Co. Just call or write.



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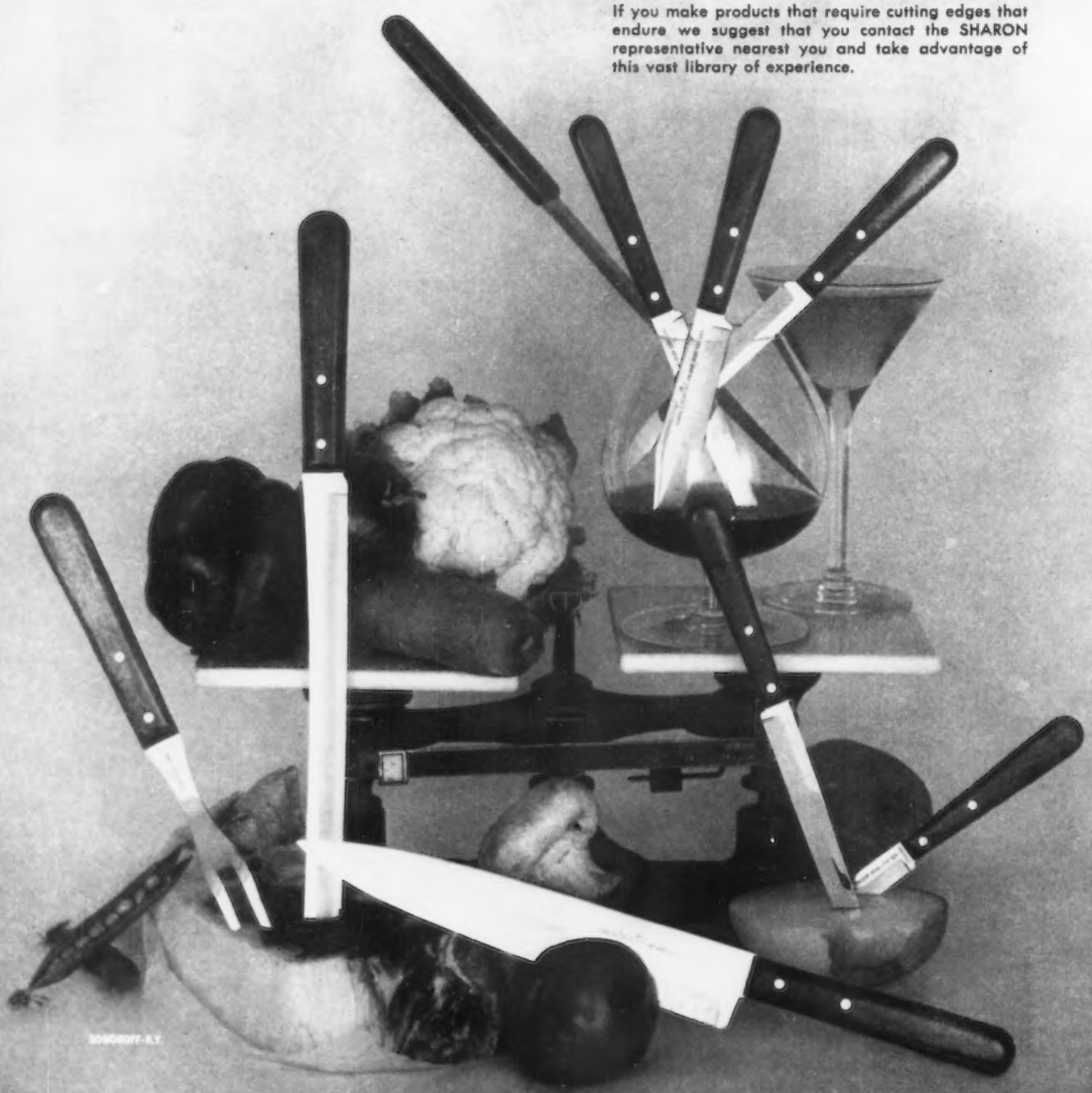
If you make products that require cutting edges that endure we suggest that you contact the SHARON representative nearest you and take advantage of this vast library of experience.



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Keep Your Head Screwed On

You Cannot Afford to Lose It!

You will soon be subjected to extreme pressure to cut costs. As the business "pause" continues this pressure may become hysterical.

Cutting costs is fine if done right. If the future of your company is endangered by the process, the error may be one of degree, of principle or of method; it may be wrong on all three counts. You must decide what to do.

You will be called upon to do things you don't like to do over the next several months. That's something you submit to now or later—if it hasn't already caught up with you.

You will face gimlet-eyed board members if you are the chief executive officer of your firm. They brook no excuses and they will make your job the toughest under fire. You must satisfy the board and yet "reach" those who work with you to determine proper measures to be taken.

It takes guts to stand up for people, things, and ideas about which you feel deeply. It will take stamina of the highest type to separate some people from the payroll and keep others. This is so because your ideas won't always jibe with those of the board or of your subordinates.

Your subordinates may think their troubles are more complicated than yours. Your head can fall farther and faster than theirs. But listen to them if they make sense. Whatever you do don't cause them to run with the pack just to save their own skin. The skin they think they may be saving may not be yours.

You executives have your job cut out for you over the next year at least. What you do then may make or break you. From a complex standpoint this period could make you materially and break you spiritually; it could also make you spiritually and break you materially. But the door is open for a ten-strike on both counts.

A moratorium on fierce personal ambition with the sole object of seeing your company come out of this correction stronger than ever is your goal. More ideas and closer attention to details accompanied by long slugs of calm but penetrating thinking will help.

Fear induced by top level orders to cut down "or else" will produce phony results. Get across what you want and why you want it—or what you don't want and why you don't want it.

Don't do anything so stupid that it will bob up later and wreck you—or your firm.

Keep your head screwed on tight and things will be all right!

Tom Campbell

Editor-in-Chief

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Norton Reinforced Wheels are built in many different varieties ...to add the "Touch of Gold"

In the complete line of Norton reinforced wheels, each type combines exactly the right abrasive, reinforcing web and bond to assure exceptional strength and safety — plus fast, cool trouble-free performance. Remember: only Norton offers you such long experience in both grinding wheels and grinding machines — to bring you the money-saving, value-adding "Touch of Gold" on job after job.

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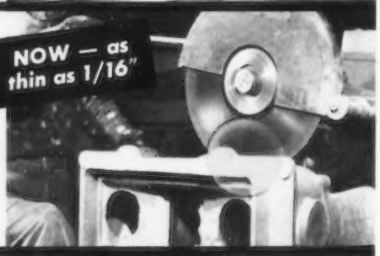
The BIG 5 in Reinforced Wheels

RN WHEELS — Glass Cloth

New — for the foundry and lower priced! Norton has been field-testing a new rubber-bonded-reinforced wheel. It's ready now and well worth your investigation for savings in your cutting-off operations on ferrous and non-ferrous metals.

BN WHEELS — Glass Cloth

Ten-inch diameter wheels can now be had 1/16" and 3/32" thick. In this range specify A36TBN. For heavy duty work, requiring larger, thicker wheels, specify A24R14BN. Use them for slotting, for cutting-off non-ferrous metals, wire rope, many non-metallic materials.



BD WHEELS — Glass-Nylon

For fastest cutting on right-angle grinders you'll want the glass cloth reinforced resinoid bonded hub wheels of rigid type. Use for medium to heavy weld grinding and smoothing flame-cut edges. Specify A24NBD for fast cut, A24QBD for long life. For cutting-off, A24RBD which is Nylon reinforced.

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Top performers for light, portable grinding. These semi-flexible resinoid wheels have cotton fabric with an additional layer of Nylon for added safety. Specify A24KBFR for weld smoothing, removing scale, light finishing, minor cut-off jobs, etc.

BF WHEELS — Cotton

These resinoid straight wheels with cotton fabric reinforcement are "the right combination" for peripheral grinding, do a fine job of deburring and finishing. Fine for blending and smoothing light welds. Also available in mounted wheels and sticks.

LETTERS FROM READERS

Shot in the Arm

Sir—Your editorial in the Nov. 28 issue (Roll Up Your Sleeves: There's Plenty of Opportunity) was indeed a shot in the arm. I certainly hope that your many thousands of other readers get the same feeling as I did upon completion.

As you say, for some reason or other, the majority of us are crying with a loaf of bread underneath our arm. We have new horizons to seek and it's going to take the good men to pull their companies through, in total.

Face Challenge — Ways and means can be found to keep top personnel challenging the new markets for their companies' product. They can't very well do it if they're home collecting unemployment compensation.

I read all of your editorials and can make one comment. I wish there were more men like you in government services directing stern policies for our national economy. —D. Balzno, Ben Sadoff Iron & Metal Co., Fond Du Lac, Wis.

Ridgway's View, Too

Sir—Your editorial in the Nov. 14 issue (Full Mobilization: It's More Than Just Things) of The IRON AGE brings out essential national needs of the present and future that will be broadly appreciated. In our opinion this editorial is notable.

We are especially glad to see in print, from your pen, in your important journal, views of the kind that Gen. Matthew B. Ridgway, the Chairman of our Board of Trustees, has been emphasizing in addresses delivered by him during the past several years. Your viewpoint and conclusions coincide with those of General Ridgway.

We think that all the members of Mellon Institute could benefit from reading your editorial. May we, therefore, have your permission to reprint this editorial in an early issue of Mellon Institute News?—W. A. Hamor, Senior Dir. of Research, Mellon Institute, Pittsburgh.

▪ We're happy to give our permission.—Ed.

No Alibis

Sir — We are greatly impressed by your editorial in the Oct. 10 IRON AGE (Alibis Are No Excuse: We Are Losing the Cold War).

May we have a tearsheet of this editorial, and permission to reproduce it for further distribution among our members and other interested persons? — H. A. Moyer, Pres., World Affairs Society, Slatington, Pa.

▪ Permission granted.—Ed.

Pull Up Your Socks

Sir—Mr. G. L. McKenna, our Vice President in charge of Sales has read your editorial, "Pull Up Your Socks: It May Get A Little Sloppy!" and was so impressed he would like reprints to send to all our field supervision.

Will you please send us 125 copies of this editorial? — Ida Spratt, Toledo Scale Co., Toledo.

▪ Copies are on the way.—Ed.

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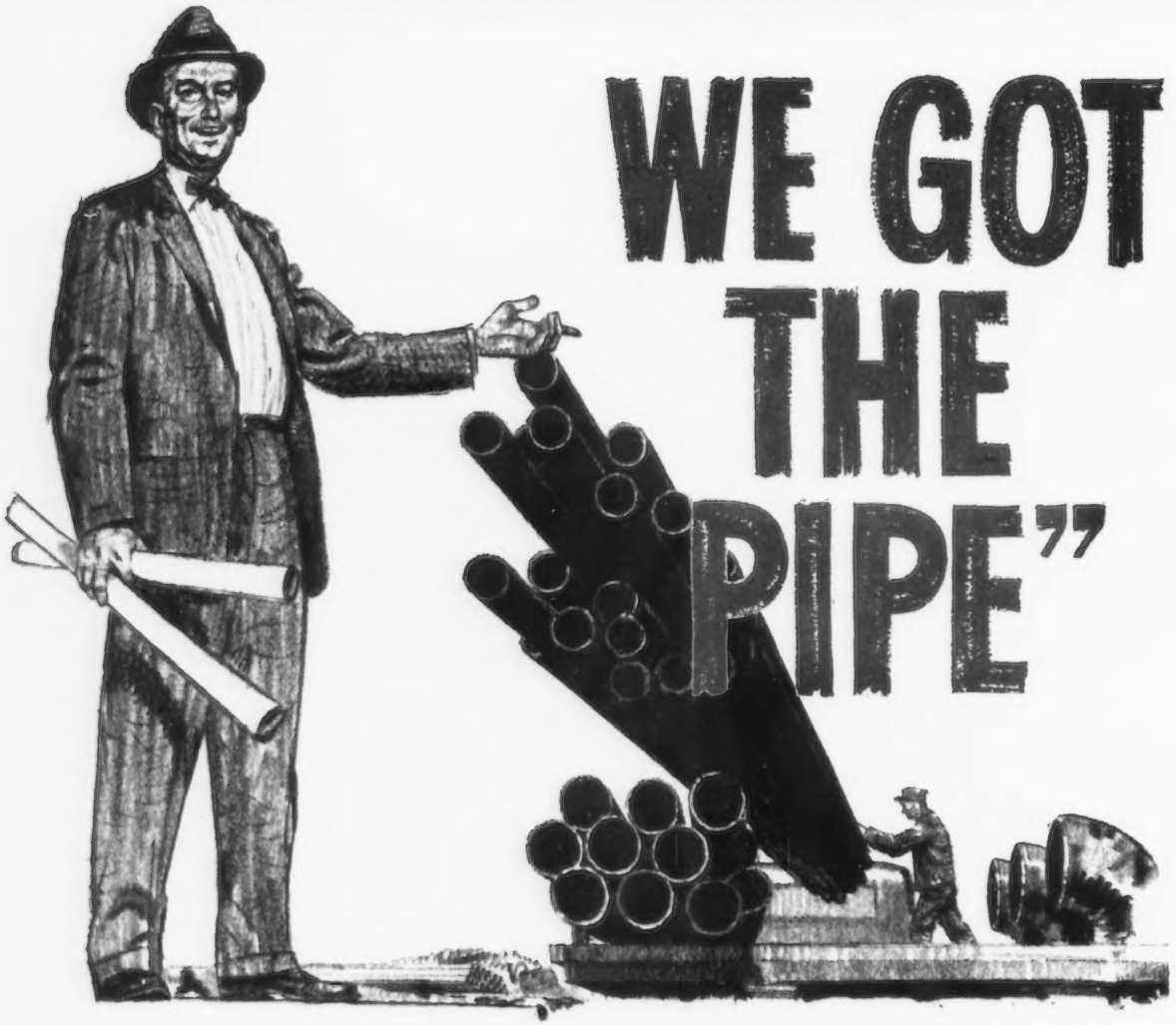

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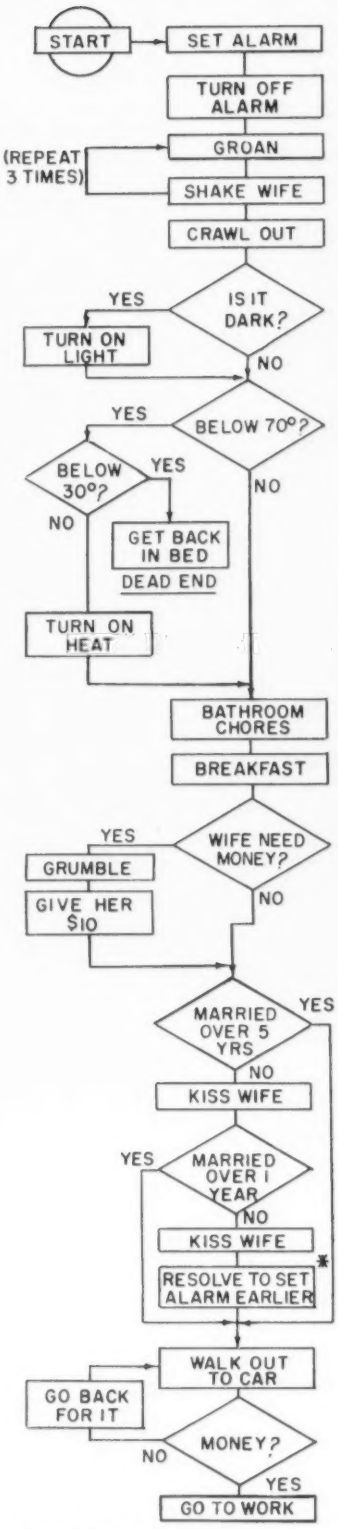
How To Get To Work

Programming in the electronic data processing field calls for boiling down intricate problems into step-by-step procedures. Each step is then coded for the data processing machines. Programmers work from a flow chart which outlines the steps to be taken.

Well, to solve one of life's daily problems, the Esso oil company has come up with the flow chart shown at right. If you follow it carefully we guarantee you will get to work on time. Thanks to Bell Aircraft News.

Equally as important as getting to work on time is the problem of holding company costs in line. In fact, we also guarantee that if you can solve this one successfully, the boss will let you come in late—but not too late. To learn more about how to make sound cost-cutting decisions we suggest you read this week's special survey report. It begins on p. 97.



*MAY BE PROGRAMMED AS ANOTHER DEAD END

Puzzlers

Ref. Oct. 31 puzzler — "A" proves he is marked as follows: Suppose I were not marked. Then "B" would know that "C's" tap could not refer to me. Hence "C's" tap could only refer to "B". Therefore "B" would know at once that he is marked. But "B" does not say anything. Therefore the hypothesis of me (A) not being marked cannot hold. Therefore I am marked. Cinch.

Winners: Dick Hautzenroeder, Detroit; E. L. Sweet, Standard Gage Co., Poughkeepsie, N. Y.; Louis Vagi, Ford Motor Co., Dearborn, Mich.; Doris Lee, Ritter Co., Rochester, N. Y.; Edgar East, National Lead Co., Fernald, Ohio; Everett Angell, Red Seal Metals Co., South Gate, Calif.; Niel Harvey, Ford Motor Co., Dearborn, Mich., and Stephen Biro, Vermont Marble Co., Proctor, Vt.

Labor and time savings are a big feature of this CINCINNATI drum-type Cleaning Machine installed in the hardware division of a big-3 automobile manufacturer. Space-saving design washes both parts and media from previous tumbling and burnishing operations, then separates media automatically.

Got a new *or* old cleaning or finishing problem? CINCINNATI engineers consistently prove time savings up to 75%, labor savings up to 81%, production increases of 120% and more! Write for details.

CINCINNATI CLEANING and FINISHING MACHINERY COMPANY
2017 Hageman St.,
Cincinnati 41, Ohio

4 OF THE MANY STYLES OF THE ONE-PIECE SEAMLESS DOOR KNOBS FABRICATED FROM RUGGED REVERE BRASS STRIP.

REVERE BRASS STRIP

Stands the Gaff!

The one-piece door knobs shown are drawn from a single blank of Revere Brass Strip, presenting an attractively smooth, unbroken surface without the need for seams or welds.

Because they are made by a unique procedure the manufacturer tells us that the brass must stand up under mighty rugged going, and that to produce the quality knobs they do, at an economical production level, the brass they use must have:

1. *Uniformity of gauge.*
2. *Absence of any sign of fracture or crimping when drawn.*
3. *Consistently correct grain structure to insure a smooth, flaw-free surface on the finished knobs.*

The manufacturer also tells us that Revere Brass Strip has been filling that bill, with utmost satisfaction, for some time.

Revere Brass Strip may be able to help *you* make a better product at less cost. You'll never know until you talk it over with one of our TA's (Technical Advisor). There's no obligation, of course. And such a discussion could save you a substantial sum of money. Such has been the case many, many times.

COPPER ★ BRASS 18 01 ★ REVERE ★ ALUMINUM

REVERE COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

230 Park Avenue, New York 17, N. Y.

Mills: Baltimore, Md.; Brooklyn, N. Y.; Chicago, Clinton and Joliet, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Newport, Ark.; Rome, N. Y. Sales Offices in Principal Cities, Distributors Everywhere.

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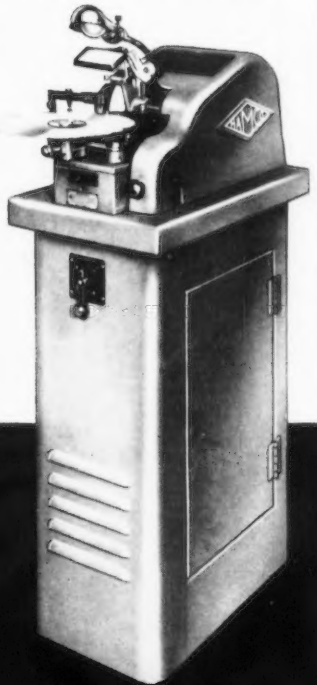
HAMCO
Automatic SAW
SHARPENERS

Quick, easy set-ups and rapid indexing now make it possible to sharpen all circular metal cutting saws from ½" to 14" diameters . . . from finest teeth up to 2 per inch inclusive.

WRITE TODAY
for complete details
and FREE literature



HAMCO MACHINES
95 MT. HOPE AVENUE
ROCHESTER 20, N. Y.

EXHIBITS, MEETINGS

Plant Management and Engineering Show—Jan. 27-30, 1958, International Amphitheatre, Chicago.

Packaging Machinery and Materials Show—March 25-28, Convention Hall, Atlantic City, N. J. (Hanson & Shea, Inc., One Gateway Center, Pittsburgh 22.)

JANUARY

Southern Industrial Distributors' Assn.—Midyear meeting, Jan. 6-8, Roosevelt Hotel, New Orleans. Society headquarters, 1626 Fulton National Bank Bldg., Atlanta 3, Ga.

Society of Automotive Engineers, Inc.—Annual meeting, Jan. 13-17, Hotels Sheraton-Cadillac and Statler, Detroit. Society headquarters, 485 Lexington Ave., New York 17.

Malleable Founders' Society—Semi-annual meeting, Jan. 17, Hotel Cleveland, Cleveland. Society headquarters, 1800 Union Commerce Bldg., Cleveland.

Institute of Scrap Iron & Steel Inc.—Annual meeting, Jan. 19-22, Eden Roc, Fontainbleau, and Deauville hotels, Miami Beach, Fla. Society headquarters, 1729 "H" St., N. W., Washington 6, D. C.

Truck Trailer Manufacturers Assn.—Annual meeting, Jan. 20-22, Palm Beach Biltmore Hotel, Palm Beach, Fla. Society headquarters, 710 Albee Bldg., Washington 5, D. C.

American Road Builders' Assn.—Annual meeting, Jan. 20-23, Sheraton-Park Hotel, Washington. Society headquarters, 600 World Center Bldg., Washington 6, D. C.

American Institute of Electrical Engineers — Winter meeting, Jan. 20-24, Hotel Statler, New York. Society headquarters, 33 West 39th St., New York 18.

Steel Shipping Containers Institute, Inc.—Winter meeting, Jan. 21-22,

(Continued on P. 16)

PROGRESS IN STEELMAKING . . .

ALL-BASIC
OPEN HEARTH
FURNACE

Provides greater refractoriness for increased production at low cost.

This development in open hearth furnaces, which has scored impressive results both in Europe and America, marks an important step forward in the history of steelmaking. In the All-Basic Open Hearth Furnace, the roof, front and back walls, port ends, downstakes, and at least part of the checker system are all constructed of basic brick.

Properly handled, the All-Basic Furnace operates more economically than those made of silica, with equal or lower fuel costs, and with decreased overhead charges, resulting in a decrease in cost of ton per ingot.

For complete information on this important new development, write for free technical report: "The All-Basic Open Hearth Furnace."

General Refractories Company
Philadelphia 2, Pa.

GENERAL REFRACTORIES

Backbone of a

THE SEAMLESS METHOD of manufacture is one of the most difficult forging operations in the steel industry. A billet of the finest steel is actually pierced to produce a seamless tube with absolutely uniform wall strength. No welds . . . no joints . . . no weaknesses.

SUN PIPE LINE COMPANY'S new 110-mile line from Twin Oaks, Pa., to Newark, N. J., doubles the company's delivery capacity of petroleum products to the vital New York area. Consisting of 10,951 tons of 14"-diameter NATIONAL Seamless Pipe, the line can handle more than 83,000 barrels of gasoline or 65,000 barrels of fuel oil every day.

UNITED STATES STEEL

Hundred Industries

NATIONAL SEAMLESS PIPE AND TUBES

Whether you are outfitting ships with high-pressure power piping, or manufacturing tubular-shaped mechanical parts, you'll want pipe and tubes that possess great strength . . . insure long life and complete dependability. In other words, you'll want USS NATIONAL Seamless Pipe and Tubes.

NATIONAL Seamless combines to the highest degree such vital qualities as strength, safety and workability. Uniform throughout and dimensionally accurate, NATIONAL Seamless Pipe and Tubes provide smooth installation and long, satisfactory service. Available in a complete range of steel analyses, wall thicknesses and diameters, every foot is produced to exacting standards by the world's largest manufacturer of tubular steel products.

We'd like to help you fit NATIONAL Seamless to your manufacturing specifications. Get in touch with us. Our engineering staff is at your service.

NATIONAL TUBE DIVISION, UNITED STATES STEEL CORPORATION, PITTSBURGH, PA.

COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS • UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

NATIONAL SEAMLESS PIPE AND TUBES

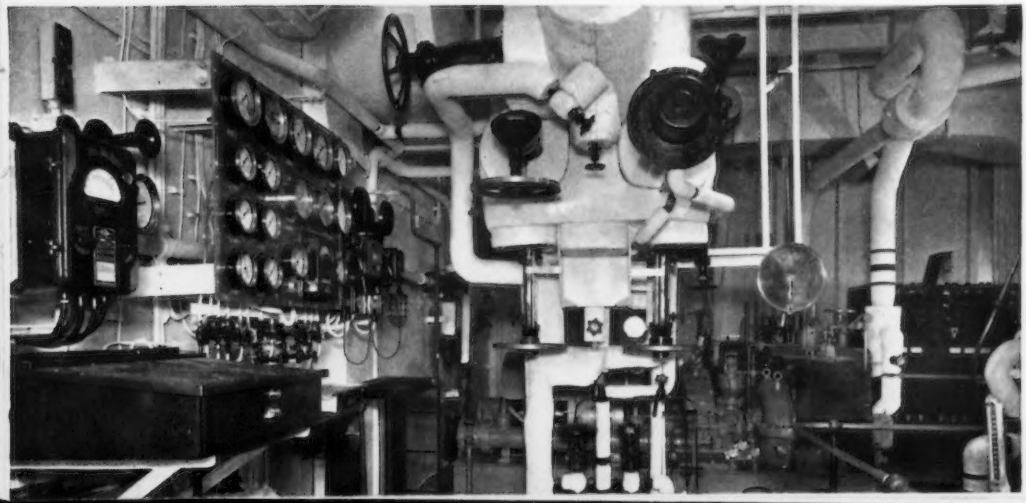
WALLS WITHOUT WELDS

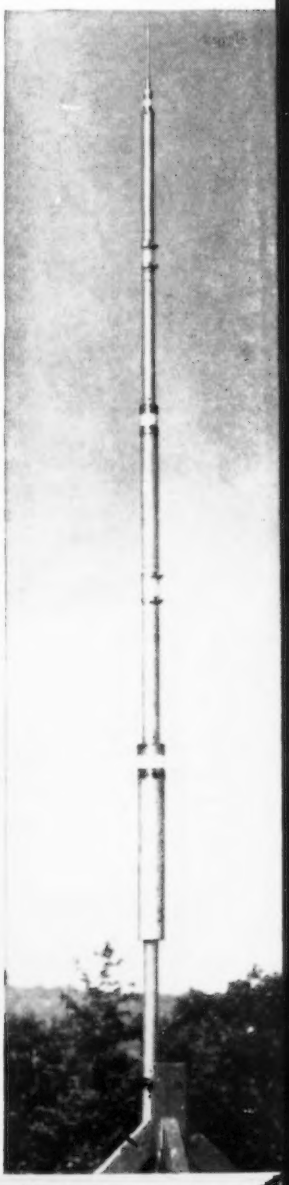
Watch the **United States Steel** Hour on TV every other Wednesday (10 p.m. Eastern time).

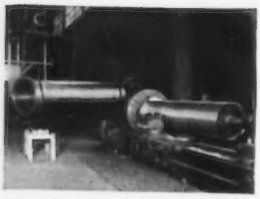
LARGEST AIR-CONDITIONED OFFICE BUILDING ever built—New York's Socony-Mobil Building—used approximately 470 tons of NATIONAL Seamless Pipe in the construction of its vast air-conditioning and heating systems. The stainless-steel-sheathed structure also incorporated 350 tons of NATIONAL Seamless into its intricate plumbing system.

TO WITHSTAND CORROSION and 100 MPH winds, this Coaxial Colinear Antenna is supported by a mast of Shelby Seamless Tubing, running through its center. Made of stainless steel, the mast possesses extremely high tensile strength, and will not flake from oxidation—a common cause of short circuits.

IN THE HULLS OF SHIPS, NATIONAL Seamless Marine Pipes and Tubing provide the ultimate in safety and dependability—transmit steam at high temperatures and intense pressures, crossing after crossing, year after year. Tough, strong, uniform—NATIONAL Seamless is ideal for any marine power piping system.







You save 5 ways with

SHENANGO CENTRIFUGAL CASTINGS

By using Shenango centrifugal castings for essentially symmetrical parts, you will gain considerable savings because:

1. The Shenango process automatically eliminates hidden defects in the metal . . . insures fewer rejects.
2. No patterns required . . . an important saving, particularly on special or small quantity runs.
3. Finer, more uniform grain structure means smoother, faster machining, better control, and a higher rate of completion.
4. With Shenango centrifugal method control, there's less excess metal to be machined away, less metal to buy and ship!
5. Because of their homogeneous, pressure-dense qualities, Shenango centrifugal castings are stronger, have better wear resistance and require less frequent replacement. Maintenance cost is cut!

Check with Shenango on centrifugally cast parts for your needs —large or small castings . . . rough, semi-finished or precision-machined . . . ferrous or non-ferrous. They'll cost you less in the long run. For bulletins, write to: *Centrifugally Cast Products Division,* The Shenango Furnace Company, Dover, Ohio.

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COPPER, TIN, LEAD, ZINC BRONZES • ALUMINUM AND MANGANESE BRONZES
MONEL METAL • NI-RESIST • MEEHANITE® METAL • ALLOY IRONS

EXHIBITS, MEETINGS

(Continued from P. 13)

St. Regis Hotel, New York. Society headquarters, 600 Fifth Ave., New York 20.

Association of Steel Distributors, Inc.—Convention, Jan.26—Feb 2, Algiers Hotel, Miami Beach, Fla. Society headquarters, 29 Broadway, New York 6.

Industrial Heating Equipment Assn.—Annual meeting, Jan. 27-28, Penn-Sheraton Hotel, Pittsburgh. Society headquarters, 1145 19th St., N. W., Washington 6, D. C.

February

Malleable Founders Society—Technical and operating conference, Feb. 6-7, Wade Park Manor, Cleveland. Society headquarters, 1800 Union Commerce Bldg., Cleveland.

American Society for Quality Control—Annual conference on management by exception, Feb. 7-8, Carter Hotel, Cleveland. Information: B. F. Goodrich Chemical Co., 3135 Euclid Ave., Cleveland.

Institute of Surplus Dealers—Annual trade show and convention, Feb. 14-17, New York Trade Show Bldg., New York. Society headquarters, 673 Broadway, New York 12.

American Institute of Mining, Metallurgical & Petroleum Engineers—Annual meeting, Feb. 16-20, Hotels Statler and Sheraton-McAlpin, New York, Society headquarters, 29 W. 39th St., New York.

MARCH

American Machine Tool Distributors, Assn.—Spring meeting, March 10-11, The Roosevelt, New Orleans, La. Society headquarters, 1900 Arch St., Philadelphia 3.

Steel Founders' Society of America—Annual meeting, March 17-18, Drake Hotel, Chicago. Society headquarters, 606 Terminal Tower, Cleveland 13.

bright future

Buildings constructed and decorated with Stainless Steel are cleaner, more attractive places to work and live. When you're planning a building . . . design it, improve it and protect it with McLOUTH STAINLESS STEEL.

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HIGH QUALITY SHEET AND STRIP

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McLOUTH STEEL CORPORATION DETROIT, MICHIGAN

MANUFACTURERS OF STAINLESS AND CARBON STEELS

IF YOU HAVE ANY OF THESE PROBLEMS...

Boring Deep Holes

Obtaining Close "No-Taper" Tolerances

Boring at High Speeds and Feeds

Controlling Drag-Out Marks

HERE'S YOUR ANSWER...

KENNAMETAL* ENCASED KENDEX* BORING BAR

Whenever a boring job requires unusual stiffness—and whenever the restrictions on the ratio of diameter to length make it impossible to get this stiffness by "beefing up" a steel bar—you'll find your answer in this new Kennametal Tool.

Because Kennametal has three times the YME of steel, the Kennametal bar body provides the greater stiffness needed to prevent chatter, taper or weaving and resulting spoilage due to drag-out scoring. Furthermore, the "Torque Tube" principle of design concentrates the Kennametal in the area of greatest stress, obtaining maximum benefits with minimum material.

Users have already reported the successful machining of jobs which were impossible to handle before . . . and greatly improved output and quality on jobs that had to be "babied" when ordinary boring bars were used.

In addition, Kennametal encased boring bars permit the use of extremely hard grades of Kennametal in cutting high-tensile steels. The stiffness of the bars prevents the vibration that causes chipping and chatter-damage to the tool, and often ruins the work. Kendex throw-away type inserts permit quick indexing of new cutting edges without affecting the bar setting, and eliminate costly regrinding.

These Kennametal Encased Kendex Boring Bars are available with square or triangular inserts in a number of types and sizes. Even round inserts can be used because of the rigidity of the bar. Special designs for unusual applications can be engineered for you. Ask your Kennametal Tool Engineer for details, or write, outlining your special requirements to: KENNAMETAL INC., Latrobe, Pennsylvania.

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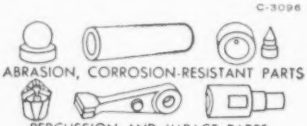
WEAR AND HEAT-RESISTANT PARTS

INDUSTRY AND **KENNAMETAL**

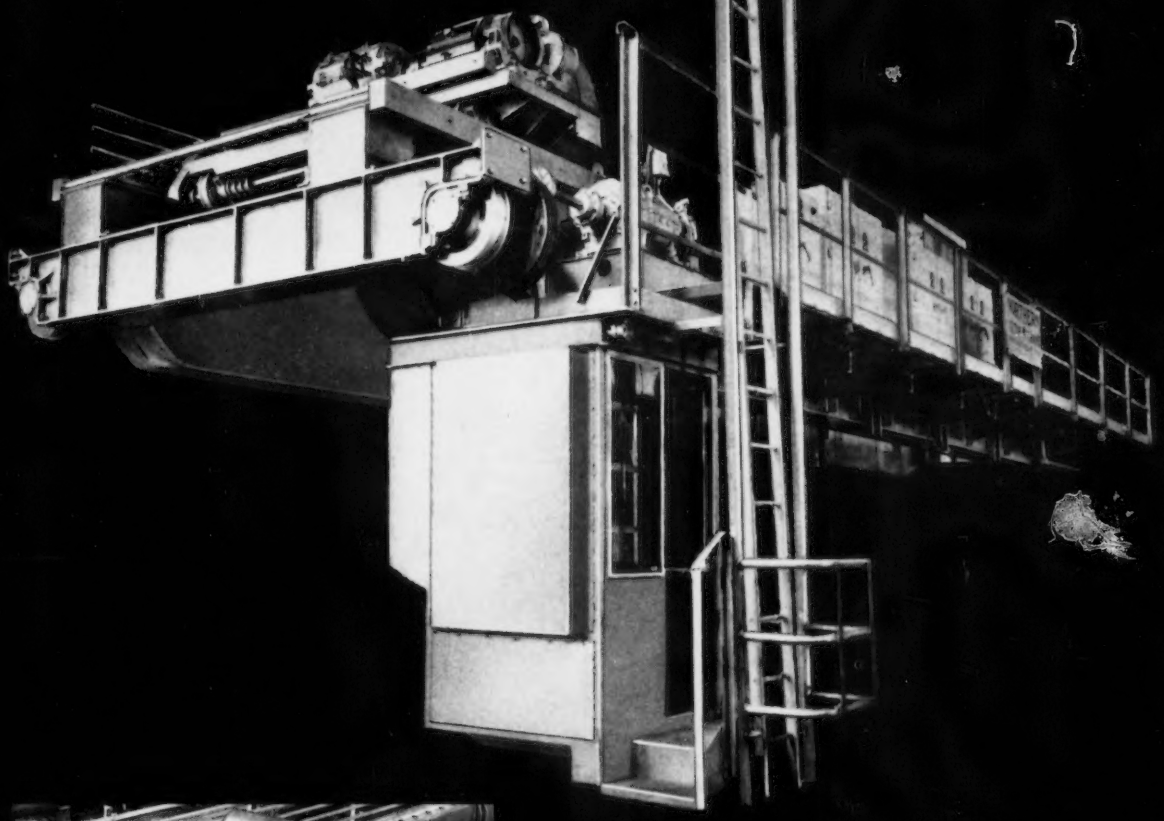
...Partners in Progress

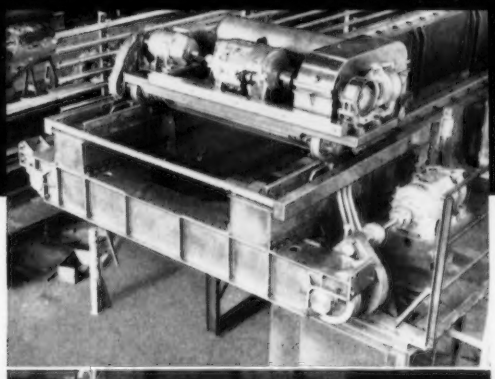


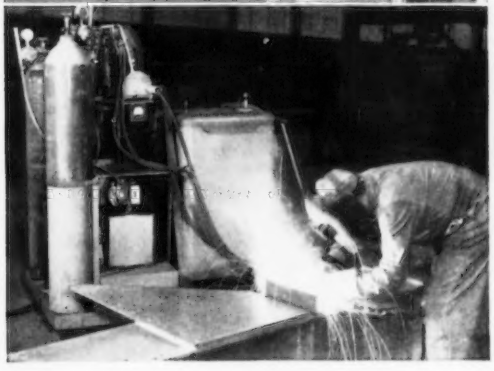
ABRASION, CORROSION-RESISTANT PARTS

PERCUSSION AND IMPACT PARTS

ALUMINUM *ALL-WELDED CRANES...*







...BY NORTHERN

Here are all-new, all-welded aluminum overhead traveling cranes built by Northern for The Aluminum Co. of America. Northern pioneered the first aluminum cranes for Alcoa — of riveted, lattice girder design — in 1930.

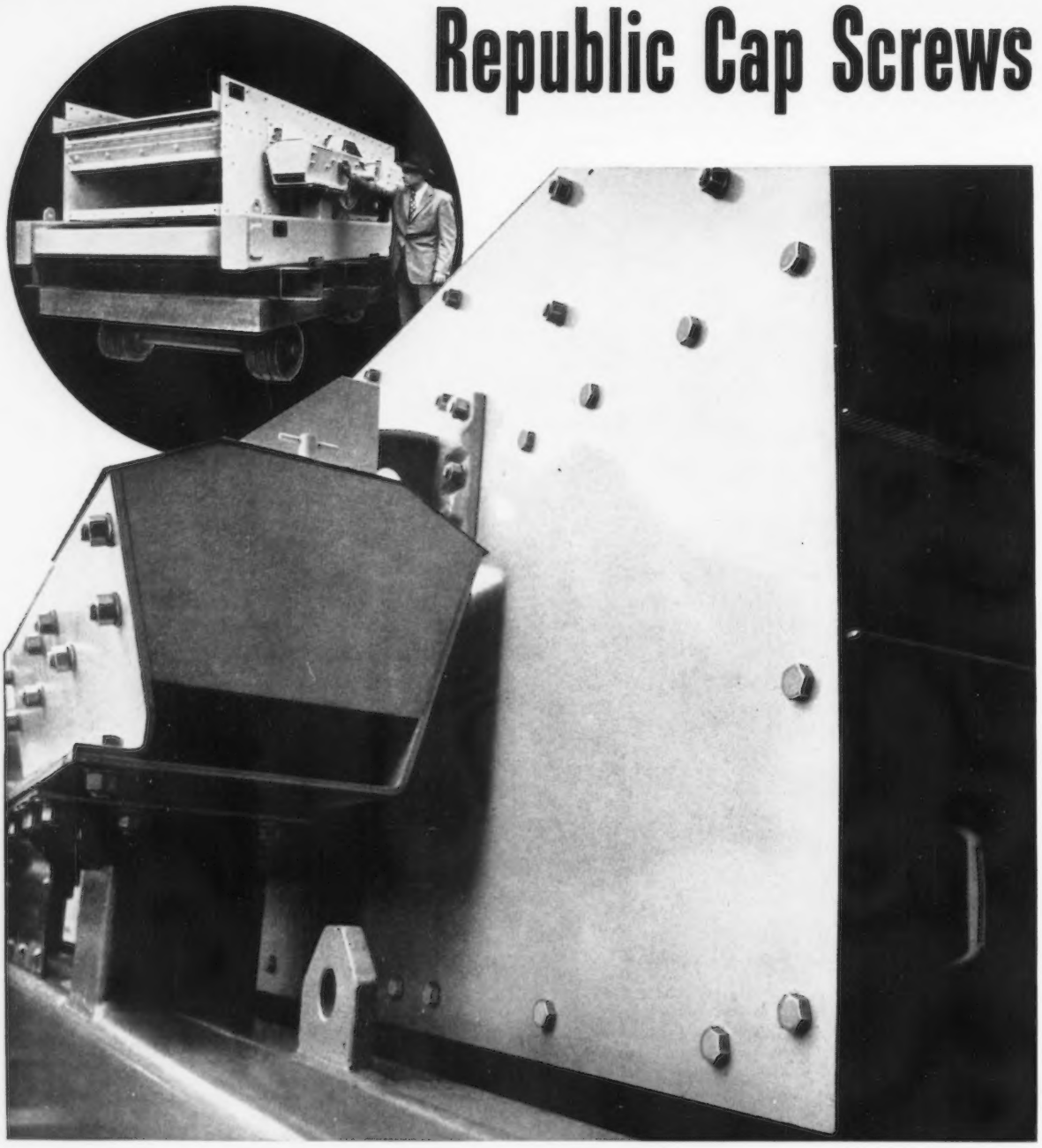
Fabricated plate, structural material and cast aluminum of high strength Alcoa alloys are used throughout, except for gears, wheels, and miscellaneous mechanical and electrical parts. Total operating weight of the above heavy duty 12-ton, 52-foot span crane is only 33,500 pounds.

Aluminum cranes reduce operating, maintenance and building costs.

NORTHERN ENGINEERING WORKS

210 CHENE STREET • DETROIT 7, MICHIGAN

Republic Cap Screws



FINAL ASSEMBLY OF MAJOR COMPONENTS on Ty-Rock Vibrating Screens uses fine-thread cap screws of several different steel analyses, depending on particular application. The W. S. Tyler Company finds this construction distributes loads better and eliminates danger of fatigue failure due to vibration and cyclic loading. Republic Cap Screws have proved more than equal to every requirement.

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

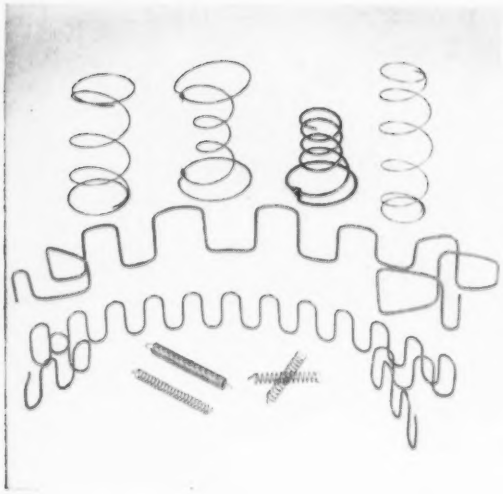
Protect Shaker Screen Performance

Sorting and sizing ton after ton of jolting, jarring, abrasive material is all in a day's work for Ty-Rock Vibrating Screens, built by The W. S. Tyler Company of Cleveland, Ohio. Satisfactory performance under these brutal conditions requires not only design and manufacturing skill, but a thorough knowledge of materials.

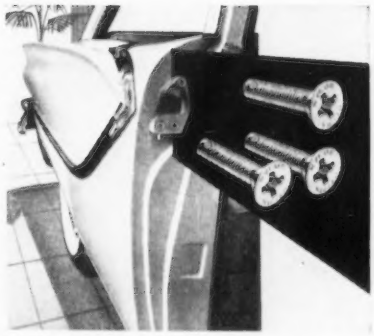
For example, Tyler has studied all types of fasteners and techniques to determine the best method of assembling heavy components. Experience has proved Republic Cap Screws more than a match for this rugged application. The clamping force produced by these strong, precision fasteners withstands both severe vibration and dynamic loading without stretching or danger of fatigue failure. The result is year-in, year-out dependability of Tyler equipment, plus easy replacement of particular parts subject to extreme abrasion.

Maximum performance under all operating conditions is typical of Republic's complete line of top-quality cap screws. Types include Hex Head, Flat Head, and Fillister Head in a wide range of sizes. All are available with either coarse or fine threads in high carbon, heat treated steel and low carbon, bright steel—plus many analyses of alloy steel and Enduro® Stainless Steel. All have finished points and full-size bodies.

For complete information on Republic Cap Screws, contact your local Republic office. Or mail coupon for data.



SPRING WIRE PERFORMANCE in your product is assured by Republic quality. Standard High Carbon Spring Wire and MB High Carbon Wire are produced by specialists who know and understand both steel making and high carbon wire drawing practices. They know spring forming machines and the importance of physicals, finish, cast and size accuracy in the end product. Republic Hard Drawn Round Steel Spring Wire, untempered, is providing outstanding performance in automotive seat and back cushions, furniture, bedding, and mechanical spring applications. Lower chemistry Border, Brace, Link and Crimping Wires are produced to the same high quality standards. Our metallurgists will assist you in selection, application and processing. Send coupon for details.



PERFORMANCE OF THIS SAFETY DOOR LATCH is protected by Republic Nylok® Bolts. They adjust to permit precise positioning of striker plate. Nylon pellet imbedded in bolt forces tight metal-to-metal lock between opposite threads, whether or not fastener is seated. Striker plate is permanently positioned to assure proper operation. Send coupon for facts.

STEEL

and Steel Products

REPUBLIC STEEL CORPORATION
DEPT. C-4396A
3104 EAST 45TH STREET • CLEVELAND 27, OHIO

Please send further information on:

- ☐ Cap Screws
- ☐ Nylok Bolts
- ☐ Spring Wire

Name_____ Title_____

Company_____

Address_____

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Christmas lives in the joy and satisfaction of the giver...

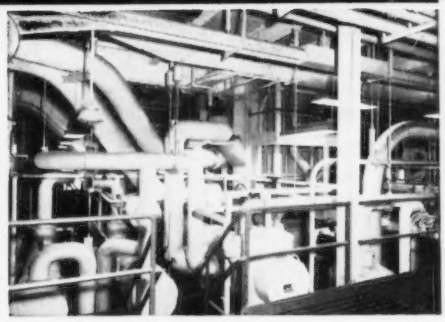
...and in the delight and thankfulness of those who receive

Almost everybody remembers to make Christmas Seals a part of his giving... because they give the greatest gift of all, health, life itself, to so many.

How about you?

The IRON AGE

BLAW-KNOX has what it takes—to provide these products and services



Heater piping system in this modern generating station is typical of many high temperature, high pressure systems prefabricated and erected by Blaw-Knox. Experienced piping engineers, modern shop facilities and a new Blaw-Knox digital computer method for fast, accurate calculation of piping stresses are available to you. Let us know your requirements and we'll provide the service you need. For more information, write for Bulletin No. 2443—"Piping for Industry."

Out of every 100 firms who lose their records in a fire, 43 never reopen for business. Be safe. Let a Blaw-Knox fire-protection engineer study your needs—and explain how you can pay for the system on our lease or deferred payment plan. To get more information send for Bulletin No. 2426—"Fire Can Destroy Your Business."

Blaw-Knox trapeze functional spring hanger installed in first large atomic generating station. Vital power piping system for the atomic generating unit in the Duquesne Light Company's Shippingport Station is supported by Blaw-Knox custom-engineered hangers.

Blaw-Knox makes a complete line of standard and custom-engineered pipe hangers, supports, and vibration eliminators. Each is a complete packaged unit, designed for a specific purpose and constructed to comply with the "code for pressure piping." Available in types and sizes to meet varying conditions, ready to install.

Blaw-Knox engineers, who have solved many difficult hanger and piping vibration problems, are always available to both design and make recommendations for your hanger requirements. For further information, write for Catalog No. 54.

BLAW-KNOX

BLAW-KNOX COMPANY

Power Piping and Sprinkler Division
829 Beaver Avenue • Pittsburgh 33, Pennsylvania

Complete facilities for prefabrication and erection of piping systems for all pressures and temperatures ... complete line of standard and custom-engineered pipe hangers, supports and vibration eliminators ... complete line of automatic sprinkler systems for standard and special hazards

STRAIGHT LINE TO HIGHER PROFITS

. . . New Booklet On Waterbury Farrel Straighteners

$ $ $

Twelve-page booklet covers Roll Feed Straighteners, Roll Straighteners, Back Tension Units and Special Straighteners for ferrous and non-ferrous sheet and strip. Includes stock, standard and special straightener units for practically the entire range of industrial application. Explains how use of a Waterbury Farrel straightener can increase production via consistent, high-precision straightening. Send for this free booklet today. Either the coupon or a brief note on your letterhead will bring it to you promptly.

The Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.

Please send Straightener Circular #620-T-5 to:

Name_____

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Company_____

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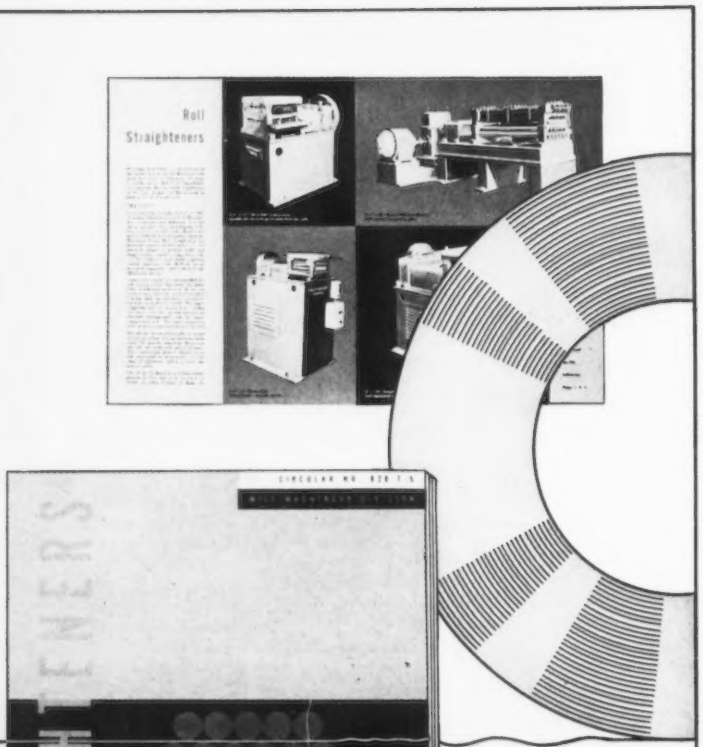
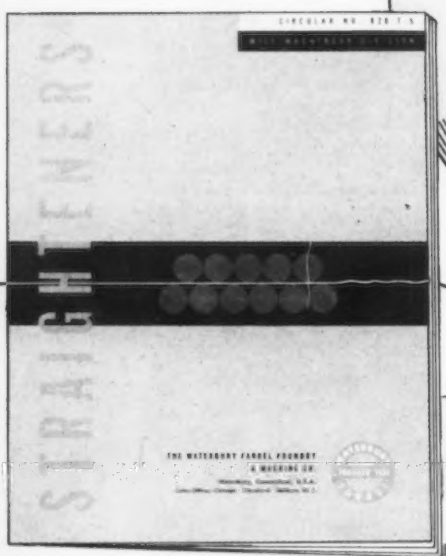
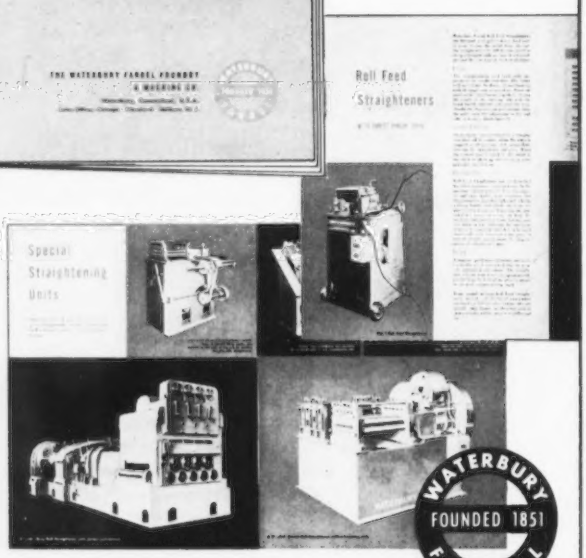
City_____ State_____

WF-40



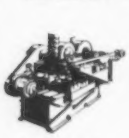


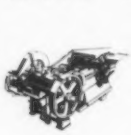


WATERBURY FARREL FOUNDED 1851

THE WATERBURY FARREL FOUNDRY & MACHINE CO.

WATERBURY, CONN., U. S. A. Sales Offices: Chicago • Cleveland • Millburn, N. J.


Bolt, Nut & Screw Machinery


Power Presses

Rolling Mill Machinery

Wire Mill Equipment

Sendzimir Mills and Other Special Machinery

Resistance Welding Tank Cooling Fins

SCIAKY

HELPS PUT PROFIT
INTO MANUFACTURING

Sciaky Techniques Permit Adaptation of Standard Equipment to Automated Production

Automated seam welding is another Sciaky Resistance Welding Technique that can improve profit potential. And, the adaptation of *standard* equipment means that now profits increase faster because no huge expenditures are required for constructing "special" welders.

For example, the largest independent manufacturer of transformers in the world, Moloney Electric Co., St. Louis, Mo., automated the seam welding operations for their distribution transformer tanks by merely adding an automatic positioning fixture to a *standard* Sciaky Patented Three-Phase Resistance Welder.

Welding cooling fins to the tanks was originally a slow, costly arc welding job, and only one "L" shaped fin could be fastened at a time. Production requirements increased and fusion welding costs became prohibitive. As a result two standard Sciaky Longitudinal Seam Welders were installed to weld fins in "U" shaped pairs. Thus, Sciaky Resistance Welding Techniques increased production, and also improved tank design. Manual positioning of tanks and fins was adequate to meet production requirements at that time.

FIG. 2 After first weld cycle begins, electrode wheels progress down first fin as tank automatically indexes into throat of the welder. The tank then indexes radially for insertion of second fin, which is welded in position on return stroke of the tank back out of throat of the welder.

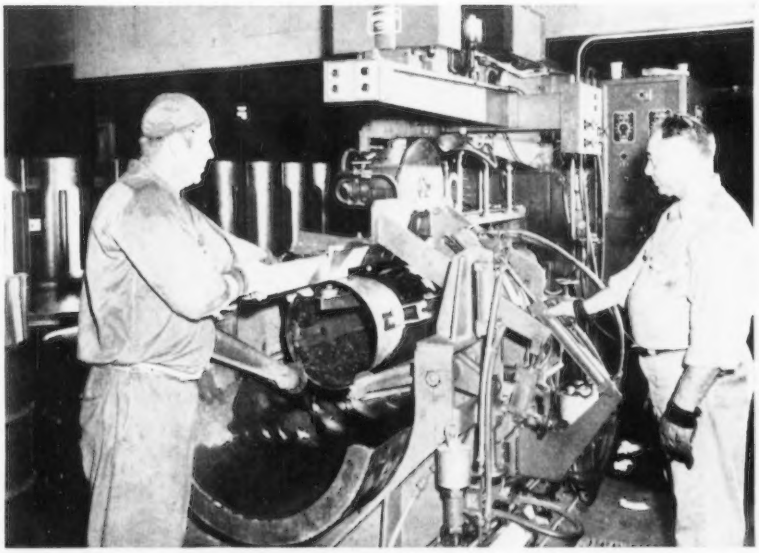


FIG. 1 After tank is loaded in automatic fixture, operator inserts first pair of "U" shaped fins in welding position. (Two brackets mounted on side of tank were joined in previous projection welding operations.)

Then, because of constantly rising materials and labor costs, Moloney faced the same "sliding profits" problem that confronts every manufacturer today. A research program was initiated to determine how to cut costs and improve manufacturing methods. This led them to study simple *automation* of the cooling fin and tank assembly operations.

Automatic Positioning Fixture

Sciaky engineers helped solve the problem with the new Sciaky Longitudinal Seam Welder equipped with special automatic fixturing. This automatic positioning fixture provides continuous, fool-proof seam welding of the cooling fins. A simple adjustment permits immediate change-over for various tank sizes, as well as radial spacing of fins.

This is how the *standard* Sciaky welder with automatic positioning fixture cuts manufacturing costs and increases production—all three operations are performed in one cycle . . .

(1) The machine welds one pair of cooling fins to the tank as it indexes into throat of welder.
(2) Positioner then indexes tank radially for the next seam welding operation.
(3) On return stroke, the machine seam welds the second fin.

Results

The Sciaky Patented Three-Phase Resistance Welder with automatic positioning fixture and two operators DOUBLED production over the previous method when two welders and four operators were required. The two previous machines and the extra two men were absorbed into other resistance welding operations.

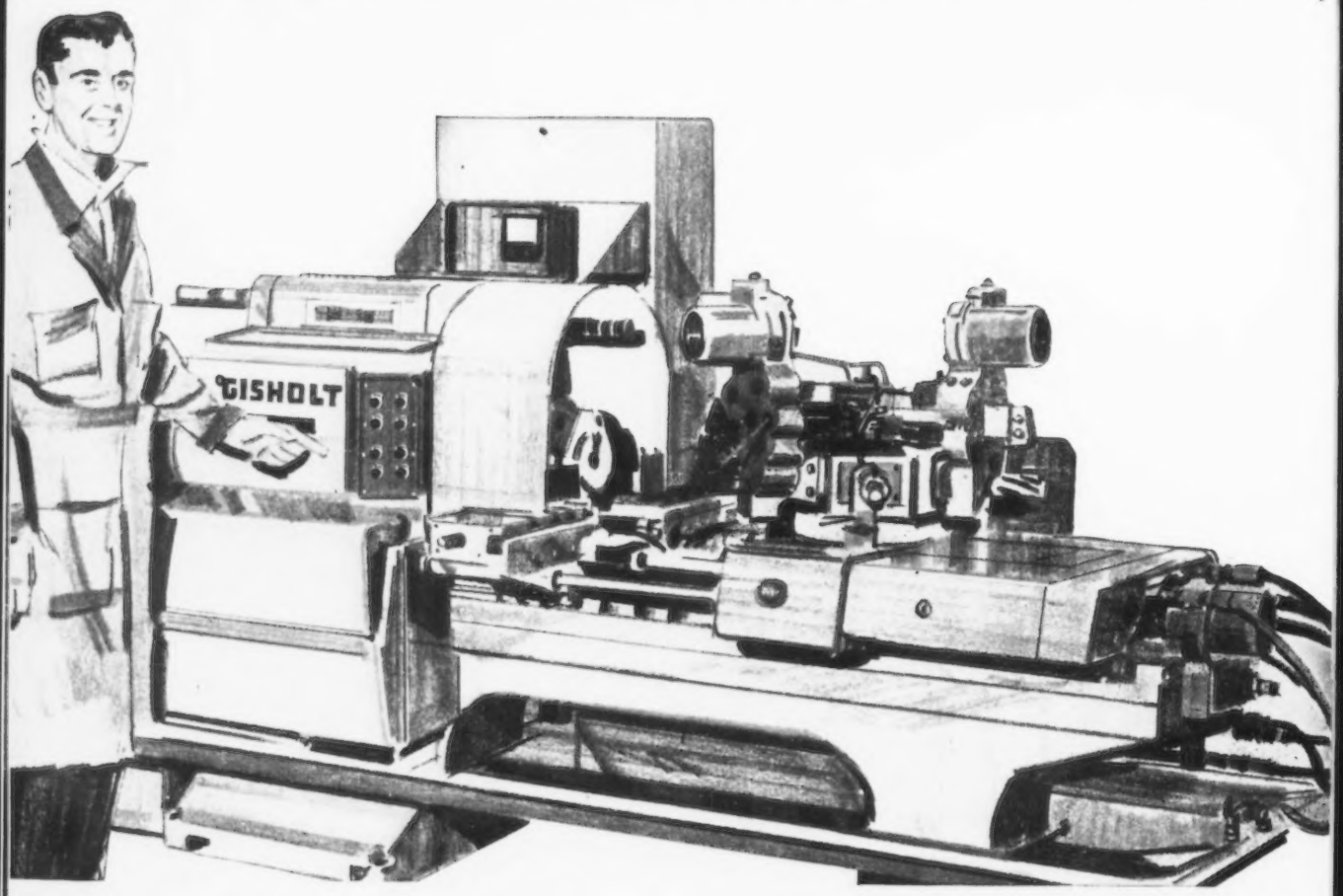
Information Available

Case histories outlining the successful use of Sciaky Resistance Welding Techniques are available on request. Specific recommendations will be furnished on receipt of an outline of your requirements.

Write today, mentioning the information you would like to receive. No obligation. Sciaky Bros., Inc., 4923 W. 67th St., Chicago 38, Illinois. POrtsmouth 7-5600. 63D

NEW Gisholt Fastermatic

CUTS YOUR SETUP TIME



GISHOLT
MACHINE COMPANY
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MASTERLINE
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TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • PACKAGING MACHINES • MOLDED FIBERGLAS PLASTICS

control panel

50% OR MORE

BY SIMPLY FLIPPING TOGGLE SWITCHES, your operators can cut automatic turret lathe setup time 50% or more with this electric setup control panel.

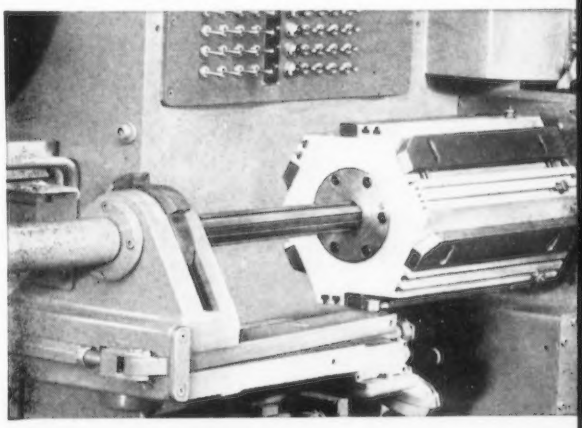
Thoroughly proved in production lines, this control panel is one of the many advanced features available on the new Gisholt MASTERLINE Fastermatic Automatic Turret Lathe.

Here's how the panel works: within finger-tip reach, your operator has a horizontal row of toggle switches for each face of the hexagon turret. By simply flipping the switches right or left, he pre-selects desired machine functions. Re-runs? Here the Fastermatic makes even more drastic cuts in setup time. A master reference card, made from the previous run, is used, and the machine is ready to go with absolute minimum preparation. Feed changes are fast and easy. Tool overhang is quickly minimized by re-positioning the saddle. Anywhere within the machine cycle, the operator can make a trial cut, withdraw the tools, mike the part, re-set the tools and resume forward feed.

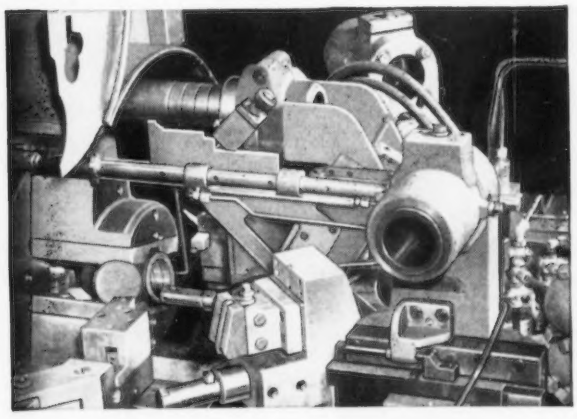
What does this versatility mean to your own operations? It means more time spent cutting chips and more profit per piece. It means that less skill is required of the operator and he is free to handle additional units or do other work during machining cycles. It means you can utilize smart tooling and eliminate human errors...get record production on long runs ...*and also get the advantages of automatic cycle operation on relatively short runs.*

Ask your Gisholt Representative to tell you about the Fastermatic's new electric control panel...its increased capacity...its higher speeds and feeds and heavier construction. You'll also want to know about using the Gisholt JETracer on the Fastermatic. Call him today—or write Gisholt for literature...ask for Bulletin No. 1179.

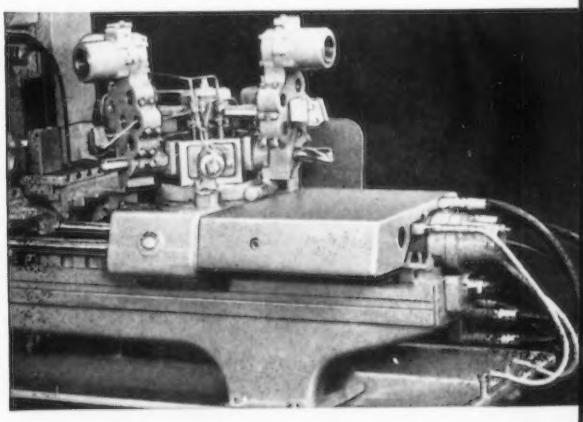
NEW GISHOLT FASTERMATIC CONTROL PANEL—simple toggle switches govern basic machine functions, cutting initial setup time in half. Master reference card is used to cut setup time still more on re-runs.



HEXAGON FEED CONTROL DRUM—positioning of adjustable flat bars on each face determines rate of feed. Thumbscrew actuator pins in slots on each face determine point of change from traverse to feed and length of feed.



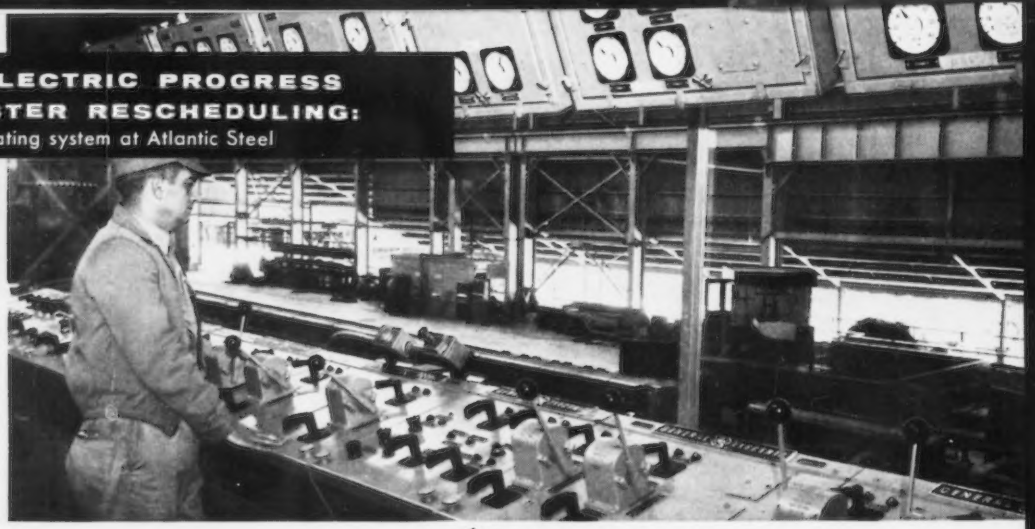
GISHOLT JETracer—mounts on any one of Fastermatic's turret stations. Provides exceptional accuracy for turning, boring or facing—either straight, taper or contour. Hydraulically operated; stylus follows contour of template controlling movement of single-point tool on sliding member.



FASTERMATIC TURRET SADDLE is hydraulically powered for indexing and longitudinal movement. Automatic cycle easily set up with turret double- or triple-tooled. CROSS SLIDES—front and rear—operated by forward movement of turret saddle, can work independently, or together, with any turret face.

GENERAL ELECTRIC PROGRESS TOWARD FASTER RESCHEDULING:

Speed-regulating system at Atlantic Steel

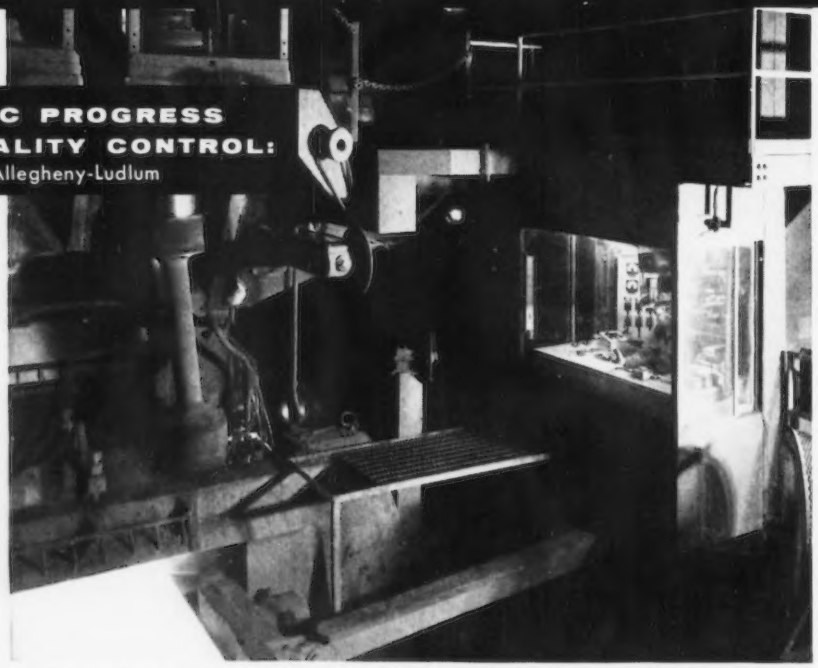


COMBINATION MERCHANT BAR AND ROD MILL at Atlantic Steel is one of world's fastest. Powered by a G-E co-ordinated drive system, it has a top speed of 5000 fpm for rods, 2000 fpm for merchant products. Pumpless ignitron rectifiers supply d-c power to main drive motors totalling 8450 hp. Centralized operator's control shown co-ordinates mill operations, permits using trained manpower most efficiently.

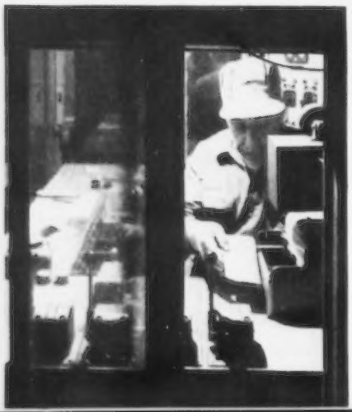
NEW AMPLISTAT-AMPLIDYNE SPEED REGULATING SYSTEM for mill motors holds 0.25% steady-state speed error from no-load to full-load, permits setting no-load speed essentially equal to rolling speed. This provides faster setting up and rescheduling. Faster response is also obtained to reduce over- and under-feed caused by impact speed drop, thereby minimizing buckling and pulling in the rod or bar.

GENERAL ELECTRIC PROGRESS TOWARD CLOSER QUALITY CONTROL:

Card program system at Allegheny-Ludlum

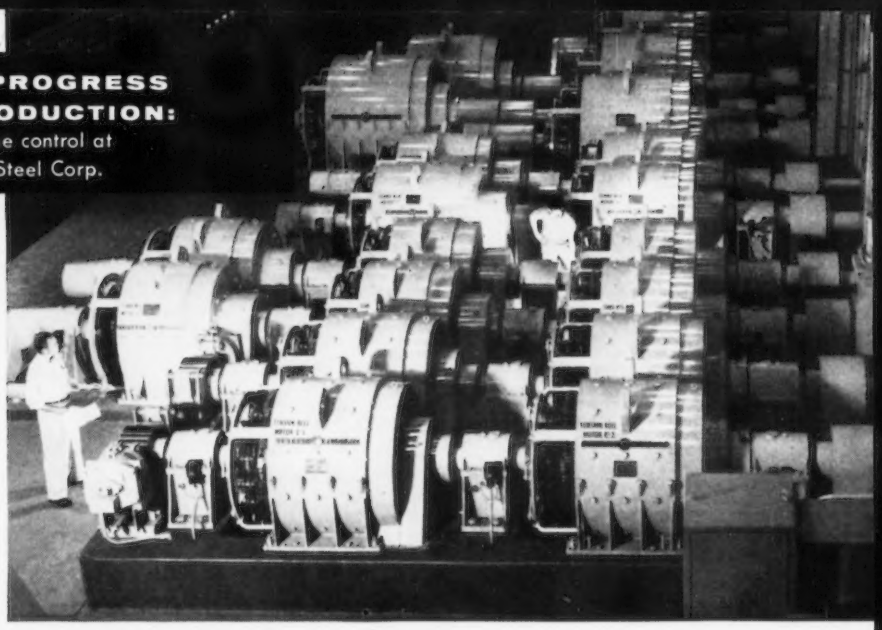


FOR FIRST TIME in the steel industry, a G.E.-developed punched-card system automatically programs and controls roll openings and mill speed on Allegheny-Ludlum's Brackenridge reversing rougher, permitting closer tolerances, closer quality control.

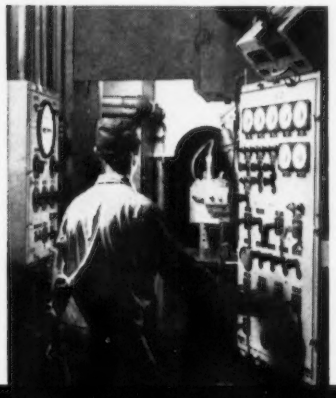


GREATER PROCESS FLEXIBILITY is provided by G-E card program control. Using standard punched card compatible with accounting, data logging, and processing systems, operator can maintain large number of optimum schedules, for wide variety of products. A 15-pass schedule and product data is programmed on one card. Operator selects desired card, inserts it in "card reader" (see photo), and pushes "next pass" button to start each pass. Card control system automatically sets the screw position and mill speed for the pass. Accuracy of the system is 0.010 inches with a maximum roll opening of 9.99 inches. Settings are provided every 0.01 inches.

GENERAL ELECTRIC PROGRESS TOWARD GREATER PRODUCTION:
Higher speed with automatic gage control at Weirton Steel Division, National Steel Corp.



MORE AUTOMATIC OPERATION at Weirton Steel's new 5-stand tandem cold mill is provided by G-E automatic gage control. Shown below are X-ray indicator for Stand 1, X-ray gage, and operator's main control panel.



WORLD'S MOST POWERFUL, Weirton's new cold strip mill contains G-E drives totalling 28,000 hp. Specially designed to fit mill's rigid space needs, G-E low-inertia d-c drive motors (above) provide fast acceleration and balanced speed regulation. Automatic gage control, developed by G.E. for the steel industry, helps this mill produce higher quality steel, with closer tolerances, at higher rolling speeds. System utilizes X-ray gages at Stands 1 and 5 controlling thickness through screwdown position at Stand 1 and main drive motor speed at Stand 5.

THESE EXAMPLES OF DRIVE-ENGINEERING PROGRESS SHOW . . .

General Electric systems contribute to steel industry's increase in productivity

As the steel industry accelerates its evolution from mechanization to automation, there is an increasing trend to larger machinery, higher processing speeds, and greater production capabilities. Keeping pace with this trend, General Electric is constantly developing the new and improved electrical techniques, systems and equipment required.

For example, horsepower levels on main and auxiliary drives are being raised, greater precision in automatic control is being achieved, and new methods of electrically regulating and programming work in progress are being used. New steel-mill drive systems are being designed—in close co-operation with steel industry engineers and machinery builders—to fit the still newer developments anticipated tomorrow. And system equipment continues to stress dependability and minimum maintenance to keep steel mill productivity high.

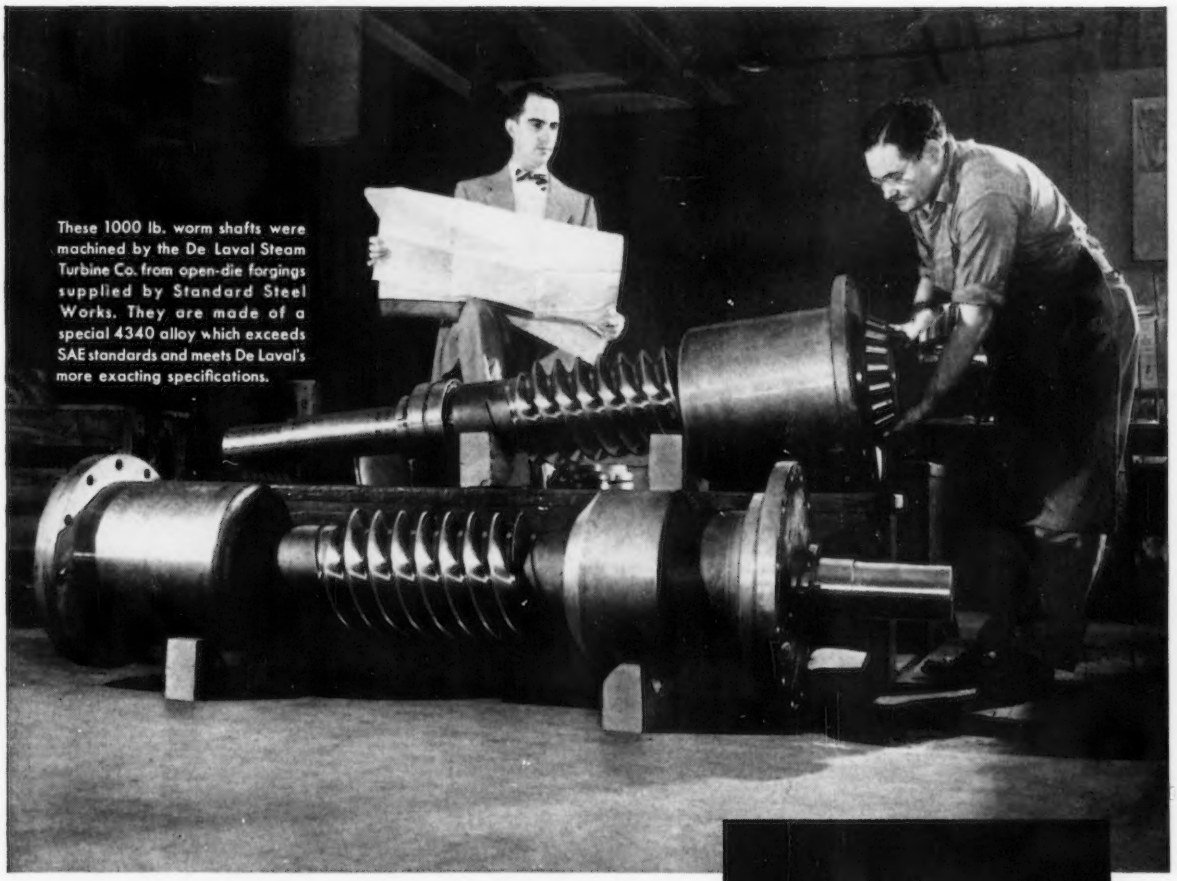
A few examples of General Electric developments along these lines are shown here. To serve *your* needs for automating electrically, profit from G.E.'s complete engineering services and system-engineered electric equipment. Contact your nearest General Electric Apparatus Sales Office. General Electric Co., Schenectady 5, N. Y.

659-118

Engineered Electrical Systems for the Steel Industry

GENERAL ELECTRIC

TAKING
STOCK
IS GOOD
BUSINESS
If you're in business, you take inventory at least once a year. It's essential to the health of your business to know where you stand. But have you taken stock of yourself recently? Do you know where you stand when it comes to cancer?
A once-a-year health checkup can tell you.
The chances of curing cancer are far greater when it is detected early and treated promptly. Living proof are the 800,000 Americans who *have been cured.*
Yet lung cancer now kills 24,000 men annually...eight times as many as twenty years ago. And thousands of these deaths could have been prevented *if the cancer had been diagnosed early and treated promptly.*
That's why it's vital for every man to have a health checkup every year, including a chest x-ray. Further, if a cough or hoarseness lingers for more than two weeks – one of cancer's danger signals – an immediate visit to the doctor is indicated.
Give yourself the same break you give your business. Take that personal inventory regularly – have a health checkup every year.
AMERICAN CANCER SOCIETY



These 1000 lb. worm shafts were machined by the De Laval Steam Turbine Co. from open-die forgings supplied by Standard Steel Works. They are made of a special 4340 alloy which exceeds SAE standards and meets De Laval's more exacting specifications.

"It used to take us 12 weeks to get the required forgings for these worm shafts. We now get them in 6 weeks —from Standard Steel Works"

We accommodate De Laval's Mr. Schwarz in two ways so as to give him the service he wants: (1) We keep ingots and billets of the special high quality steel De Laval demands on order point—we can meet even the largest requirements on short notice; (2) each forging is tested and inspected—the product of complete and precise quality control. Mr. Schwarz knows he can expect not only service, but also quality when he orders forgings and castings from us.

Mr. Schwarz is just one of many industrial executives who have been impressed with the extra *service* we enjoy rendering. Not a month goes by that De Laval doesn't come to us with some special request which we can meet, and cheerfully. And hardly a day goes by that one of our many customers doesn't put our boast of personalized service to the test. Why don't you let us handle your next forging or casting requirement. You'll appreciate our service as well as our know-how. Write Dept. I-M.

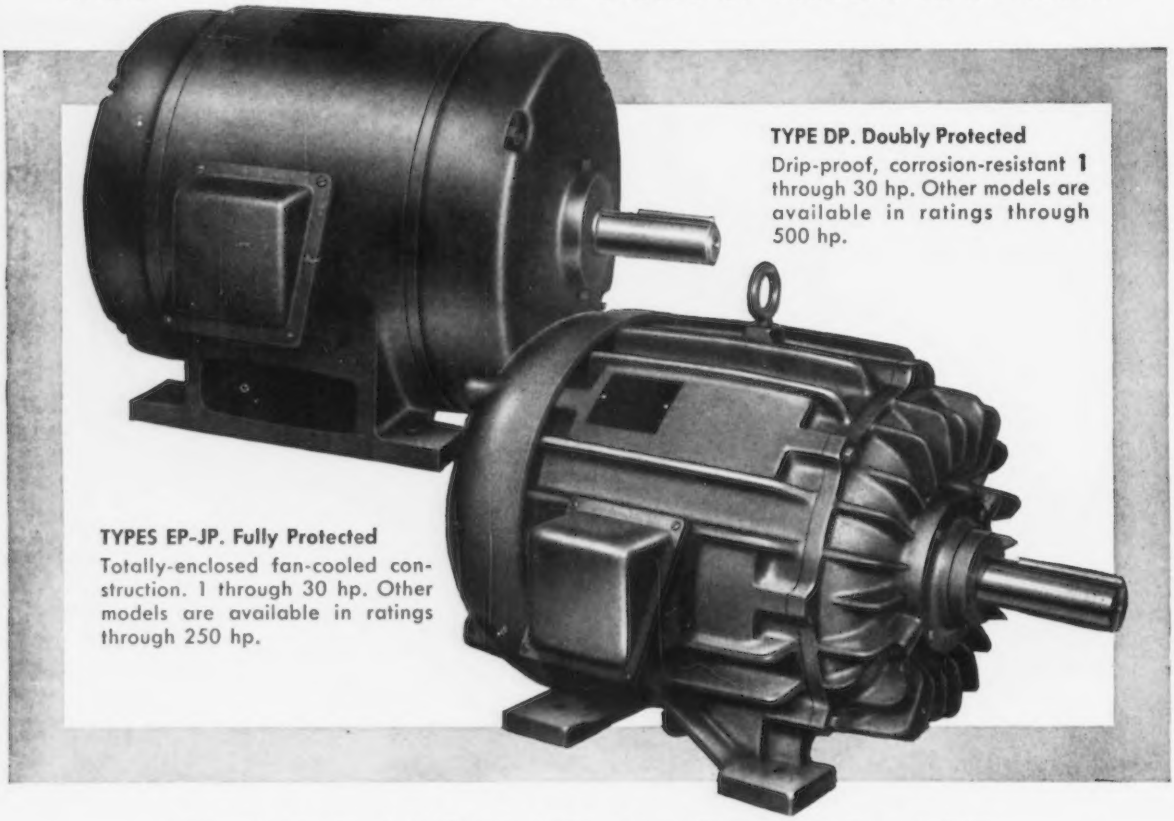
"It's not unusual for me to be invited out on the floor to talk with the men who are actually making castings and forgings for us. In my opinion it's the personal interest which the men at Standard take in a customer's order that lies behind the consistently excellent service they render," *says E. T. Schwarz, Director of Purchasing, De Laval Steam Turbine Co., Trenton, N.J.*

Standard Steel Works Division

BALDWIN · LIMA · HAMILTON

BURNHAM, PENNSYLVANIA Rings • Shafts • Car wheels • Gear blanks • Flanges • Special shapes

WAGNER ELECTRIC MOTORS...THE CHOICE OF LEADERS IN INDUSTRY



TYPE DP. Doubly Protected
Drip-proof, corrosion-resistant 1 through 30 hp. Other models are available in ratings through 500 hp.

TYPES EP-JP. Fully Protected
Totally-enclosed fan-cooled construction. 1 through 30 hp. Other models are available in ratings through 250 hp.

PRODUCTION GOES UP

when you power equipment with these Wagner Motors

Production is increased when motor down-time is reduced. To meet today's industrial demands for faster, more dependable production, Wagner has designed these industrial motors with *extra* protection that cuts time-out for motor maintenance to a minimum.

These motors pack more power in less space—1 through 30 horsepower in NEMA frame sizes 182 through 326 U.

EXTRA PROTECTION—Type DP is doubly protected by a rugged corrosion-resistant cast iron frame and by completely drip-proof enclosures.

Types EP and JP are totally enclosed against dust, grit, fumes or moisture—protected against corrosion by cast iron frames. Type JP is explosion proof as well.

COOL RUNNING—Both types are cool running. Blowers and special baffles direct cooling air through the DP motor. Types EP and JP are fan-cooled and are built with ribbed frames to increase the cooling surface.

LONGER BEARING LIFE—Original bearing lubrication will last for years in service under normal conditions, but openings are provided in the bearing housing to add fresh grease—remove old grease when required.

Let a Wagner motor application engineer show you how well these motors can fit *your* needs. Call the nearest of our 32 branch offices, or write us. Bulletins MU-202 and MU-203 give complete information on these Wagner Motors. Write for your file copies today.

Wagner Electric Corporation
SERVING INDUSTRY SINCE 1891

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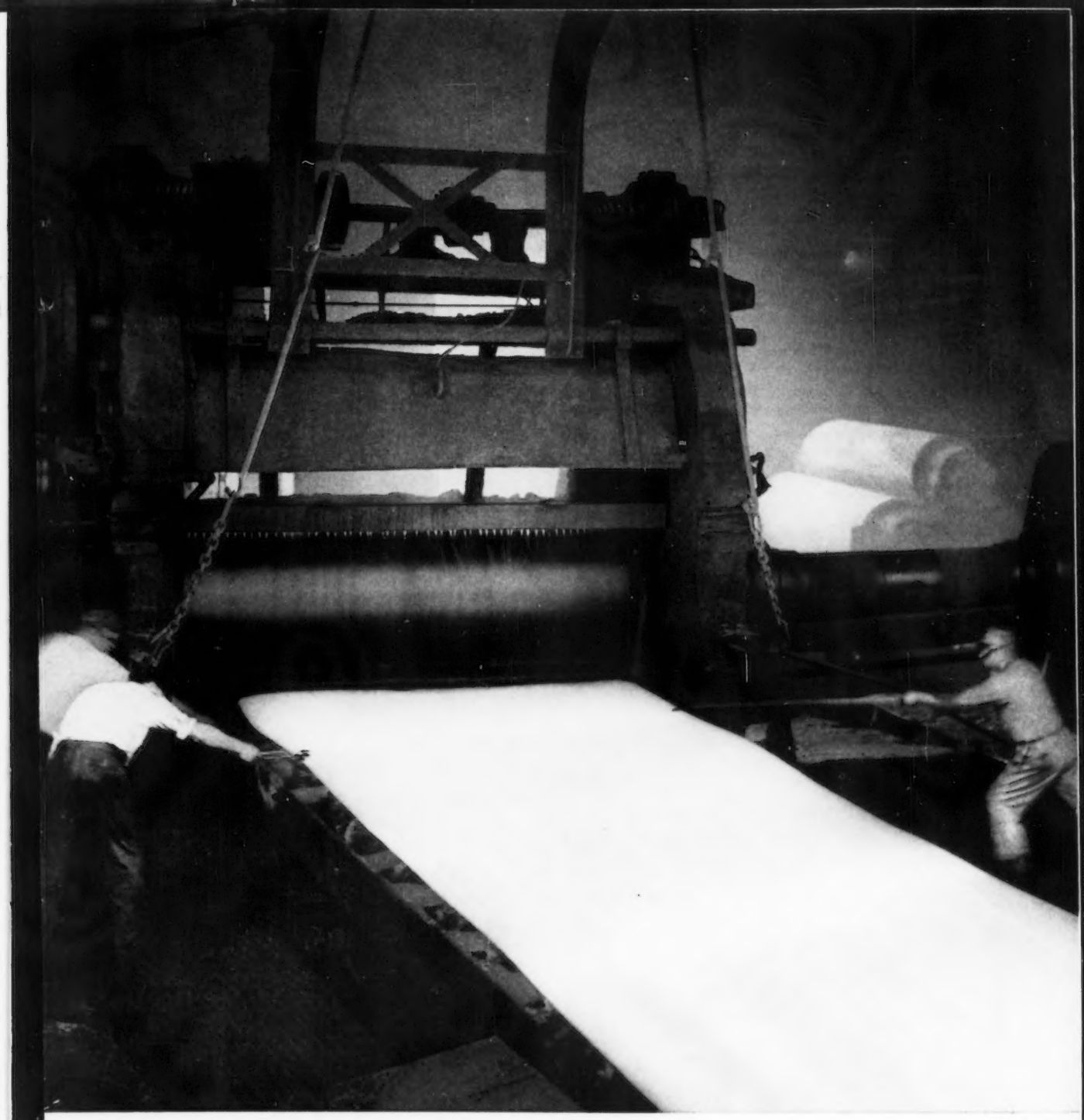
ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES • AUTOMOTIVE BRAKE SYSTEMS—AIR AND HYDRAULIC



Backbone of America's growth: steel plate

Heavy carbon steel plate from Barium Steel mills at Harrisburg, above, along with structural steel from Phoenixville, has been helping to build America for almost a century.

Today, these basic steel products go into bridges, ships, railroad cars, process equipment, and capital goods of all kinds. With such diversified applications in so many expanding industries, the demand for these "staples" in steel continues to grow. Specialization in these "staples" . . . steel plate, structural shapes, and heavy wall seamless pipe and tubing . . . is an important reason for Barium's own continuing growth. 7.9

B **BARIUM STEEL** CORPORATION

BARIUM STEEL CORPORATION, 25 BROAD STREET, NEW YORK 4, N. Y.

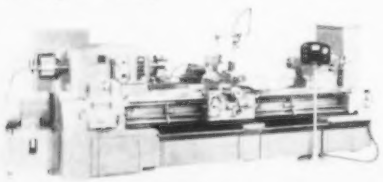
It's a breeze

TO CUT COSTS, BOOST PRODUCTION AND QUALITY WITH THE MONARCH "AIR-GAGE TRACER"

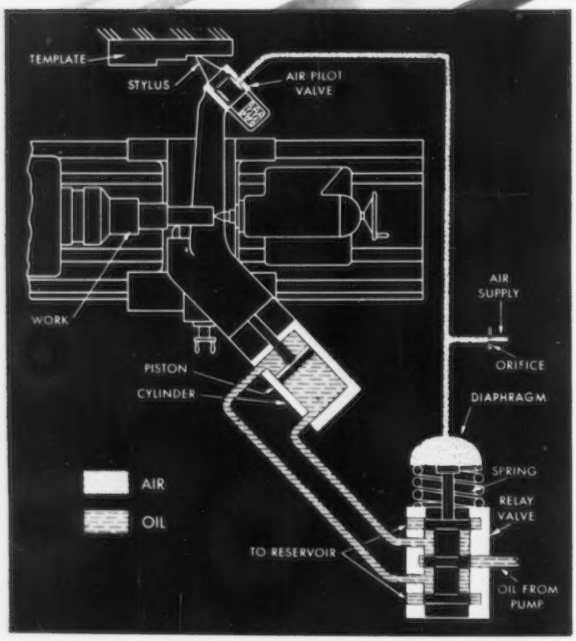
No lathe development in recent years has equaled template controlled turning for substantial cost reduction. Its advantages, when performed the Monarch "Air-Gage Tracer" way, are many. This duplicating method:

- Always outproduces a manually operated machine; in some instances as much as 8 to 10 times.
- Provides automatic sizing, thereby reducing spoiled work to the absolute minimum.
- Imparts a smooth, stepless finish on any combination of cuts, whether turning, facing or boring.
- Often halves amount of stock left for grinding; sometimes eliminates grinding and polishing operations.
- On most work, reproduces accuracy of template within ± .001".
- Eliminates the need for expensive form tools and the cost of multiple tool setups.
- Allows a complete setup change in as little as 15 to 20 minutes; tool change in 1 minute.

Write for complete descriptive booklet No. 2608. It contains dozens of typical job examples... ***The Monarch Machine Tool Company, Sidney, Ohio.***



Above is a Monarch Series 62 Preselector Dyna-Shift Lathe with "Air-Gage Tracer" and auto cycle unit. This duplicating means may be factory applied to all Monarch lathes.



This diagrammatic drawing shows simplicity of "Air-Gage Tracer" operation. Note that design deals with both air and oil in constant motion. Result—super-accuracy piece after piece, job after job.

Exclusive Features of the "Air-Gage Tracer"

1. The only lathe duplicator which utilizes the combination of air-hydraulic control. That's the secret of its super-accuracy.
2. The air circuit is an open loop servo system which provides air-gaging and multiplies both force and motion.
3. It's the simplest and most trouble-free of all lathe duplicating methods. Tracer head maintenance is never a costly problem.
4. Stylus pressure against template is only 5 to 6 ounces, practically eliminating template wear.
5. Either a flat or a round template may be used. Never is it necessary to use a large, bulky round template so that it can be indexed periodically due to excessive wear from high stylus pressure.
6. Available both in a rigid and swiveling type, the latter of which may be used at any setting between 45° and 90°. Universal nature of swiveling type a "must" for top production on many complex facing and boring operations.
7. The only lathe duplicator offered optionally with full automatic cycling and potentiometer feed control.

Monarch
TURNING MACHINES
ACCURACY • ECONOMY • LONG LIFE
FOR A GOOD TURN FASTER . . . TURN TO MONARCH

it's easy
to recognize
superior
quality
brass and
aluminum
bearing this
trademark
identification

made better
to bring out the
best in your
fabricated products

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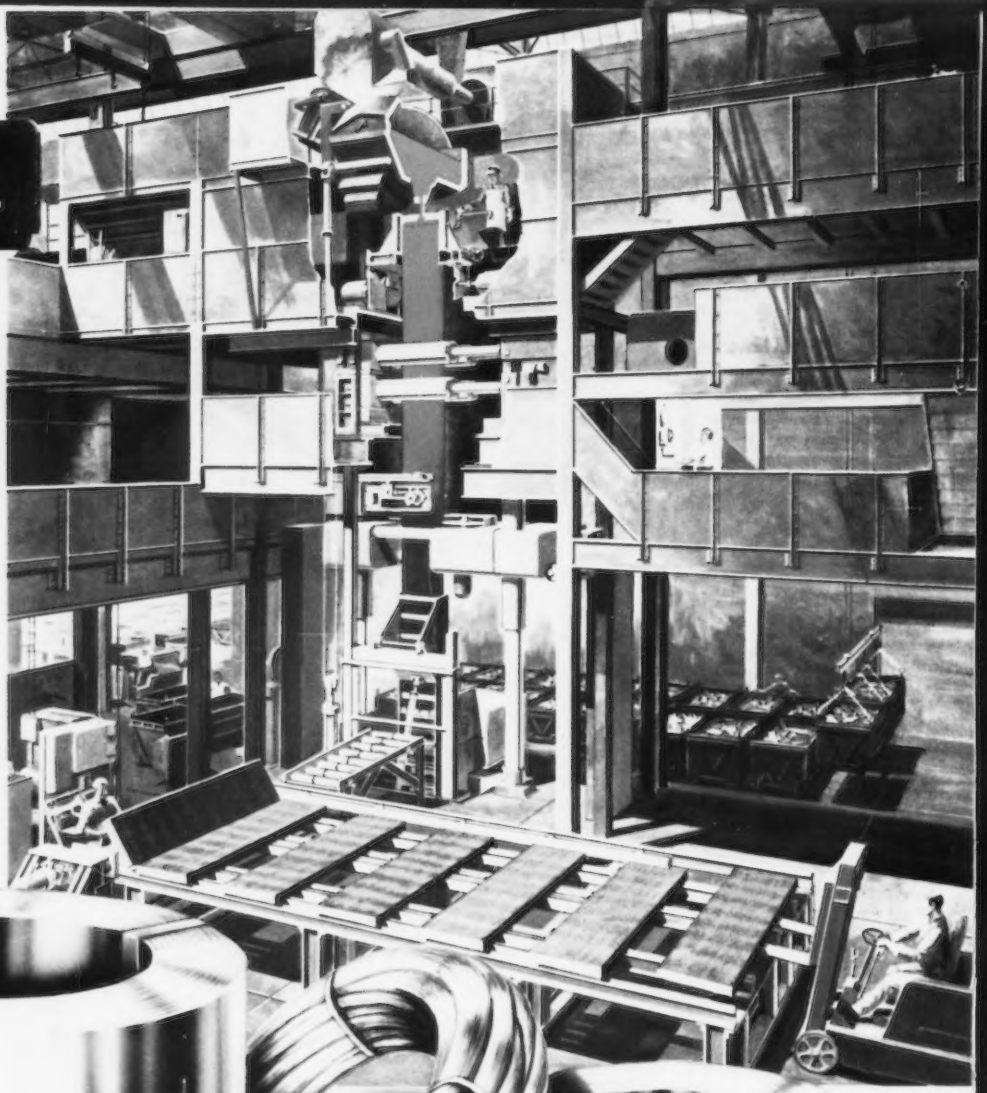
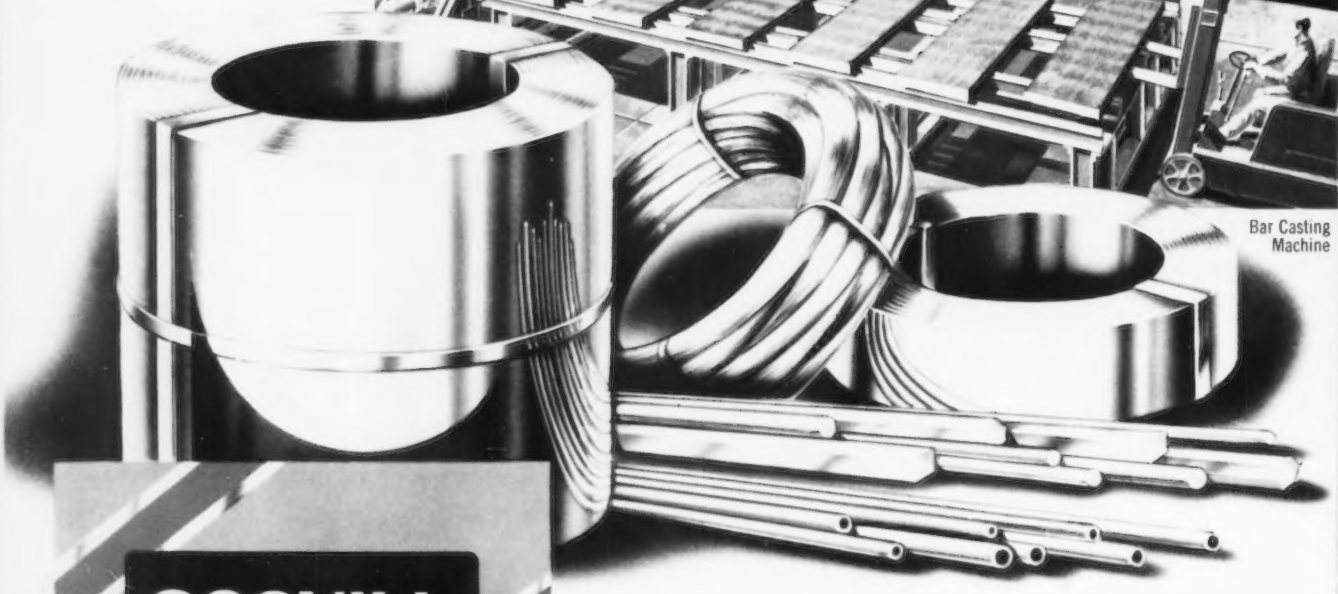
Continuous-cast Brass

means
soundness
uniformity
superior quality
maintained order
after order... and
lot after lot.



Bar Casting Machine



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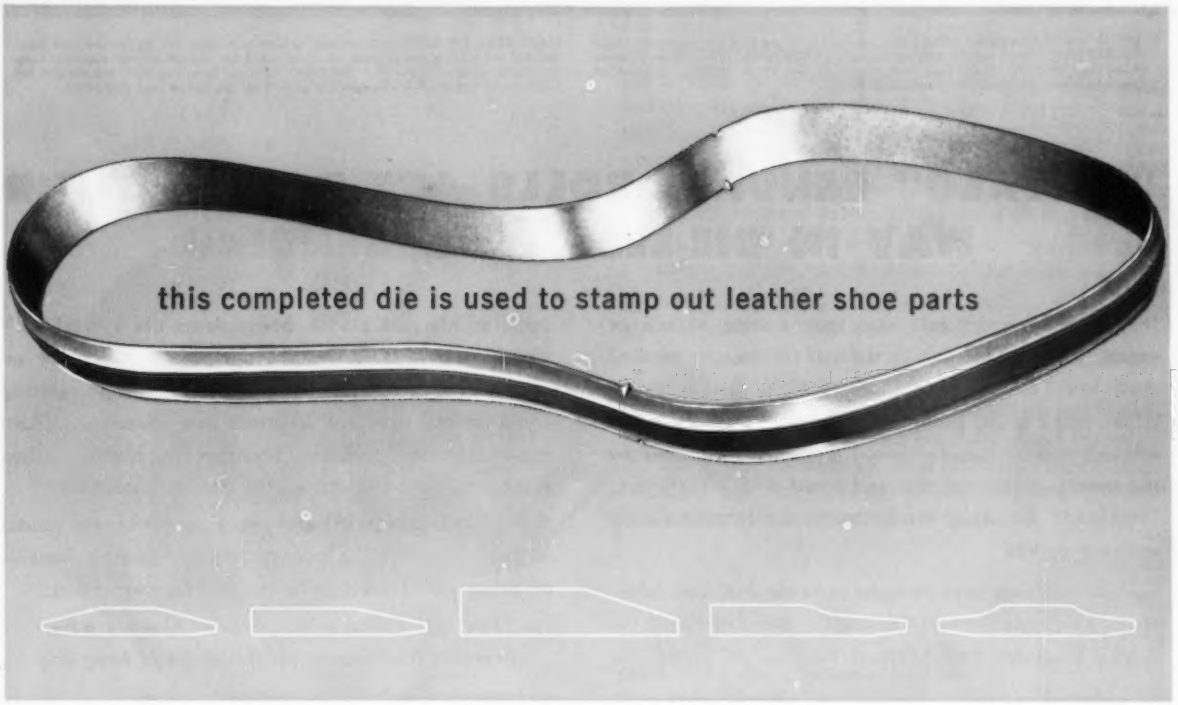
SCOVILL BRASS MILL PRODUCTS

Scovill Continuous Casting Machines have produced, from 1938 through 1956, over 1700 miles of inherently SOUND and perfectly UNIFORM metal in billets for hot extrusion into rod, wire and tube, and bars for cold-rolling into strip and sheet. Never before has mass production of copper-base alloys been maintained to such closely controlled standards . . . an achievement resulting in BRASS MILL PRODUCTS of a quality second to none.

Scovill Manufacturing Company, Mill Products Division, 99 Mill Street, Waterbury 20, Connecticut. Phone Plaza 4-1171.

CHOOSE CRUCIBLE COLD ROLLED CLICKER DIE STEELS

FOR CLOSE TOLERANCES—FINE FINISH



Crucible clicker die shapes are cold rolled for better finish, closer size tolerances and minimum decarburization. And their thinner edges require less grinding and filing to complete the die.

What's more, *closely controlled* electric melting gives Crucible alloy clicker die steels maximum toughness, combined with just the right hardness after heat treatment. Edges *stay* sharp, yet are easy to file.

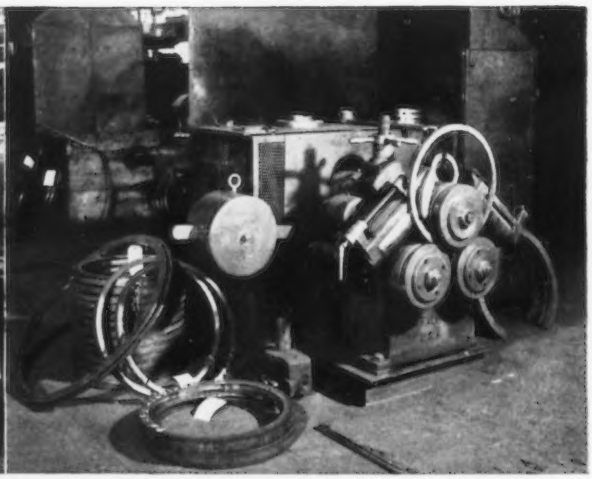
Does one of the basic shapes shown fit your exact needs? Or do you require a similar shape in carbon or alloy steel for this or other applications? In either case, you'll find reliable delivery, and helpful service, when you order through your nearby Crucible Branch. *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

For shapes and details send for Clicker Die Information Sheets.

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

UP TO 104-FT. DIAMETER RINGS for internal bracing of large elevated tanks — cold bent from heavy angles, leg-in, on "Buffalo" No. 3 Horizontal Bending Roll, to fractional-inch accuracy — by a leading fabricator. Machine uses no dies, only standard rolls.



FLATS BENT ON EDGE into spirals, which are then cut to circles and butt-welded — a high-production method used by major motor manufacturer for stator ring output. The "Buffalo" Vertical Bending Roll makes the job easy. Rolls are readily changed, adjusted to the shape and diameter.

"BUFFALO" BENDING ROLLS ARE PAYING THEIR WAY IN DIE-LESS COLD BENDING

If you bend structurals into arcs, circles, spirals or segments in any quantities, there is no cheaper method than with a "Buffalo" Bending Roll. Bridge fabricators, steel mills, heavy equipment builders, aircraft and automotive users — metal working industries by the score — enjoy the ease and speed with which their "Buffalo" Bending Rolls turn out commercially accurate curves.

Steel warehouses have brought in profitable, new fabrication business by purchasing a Bending Roll. A mower manufacturer adapted his roll to apply the twist to his reel blades. Many firms use special rolls for 1001 highly specialized operations. All agree on the exclusive "Q" Factor* features of rigid, lasting construction, easy roll changes and diameter adjustments, simple operation requiring no highly skilled personnel — and no expensive die requirements.

Write for Bulletin 352 and check details on the model to put your bending operations on a paying basis — or bring profitable new business into your plant.

**The "Q" Factor — the built-in Quality which provides trouble-free satisfaction and long life.*

CONVEYOR MANUFACTURER gets fast output of curved sections involving angles and flats bent into arcs by "Buffalo" Bending Roll.

Any structural shape including tubes and pipes are easily and accurately bent to desired curves.

ESTABLISHED 1877 "Buffalo" MEMBER N.M.T.B.A.

BUFFALO FORGE COMPANY

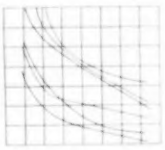
492 BROADWAY BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

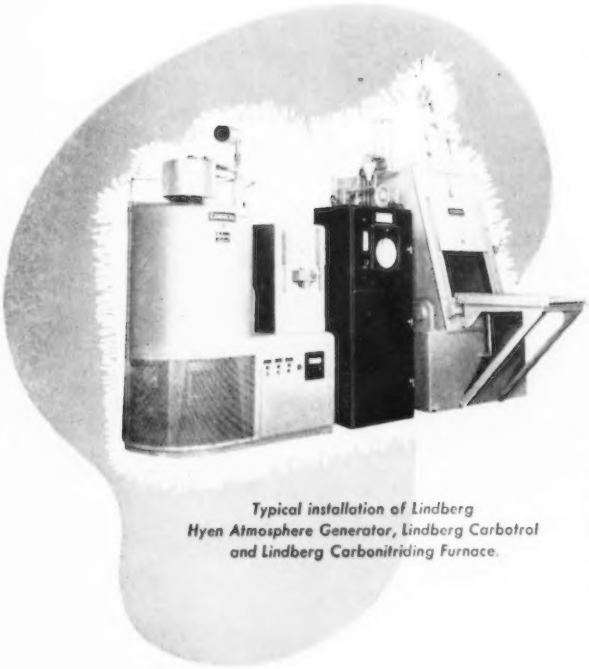
DRILLING PUNCHING SHEARING BENDING

What every good metal man should know about CARBONITRIDING

First of all, it is a good idea to know what equipment will do the best carbonitriding job for your specific requirement. And the best way to find this out is to talk over your problems with the people who have consistently developed the methods and equipment for better, more dependable, more economical carbonitriding results. That would be Lindberg.

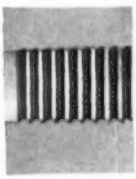


Let's look at the record. Lindberg's contributions to carbonitriding and carburizing go far beyond just the building of furnaces to do it. It covers the development of controlled atmosphere generators, the creation of dew point equilibrium curves to establish proper atmosphere values for type of steel and temperatures involved and the exclusive Lindberg Carbotrol to maintain these values automatically in production.



Typical installation of Lindberg Hyen Atmosphere Generator, Lindberg Carbotrol and Lindberg Carbonitriding Furnace.

Then there is the invention of the "dimple" vertical radiant tube which gave new efficiency and economy to fuel-fired atmosphere furnaces. Lindberg's exclusive CORRTHERM electric heating element made practical the use of electricity in atmosphere furnaces.



Add to this our record over the years of building a broad variety of carbonitriding and carburizing furnaces, big ones, small ones, manuals, automatics, fuel-fired, electric, and it seems it's just good common sense to bring your heat treating problems to us. Just get in touch with the Lindberg Field Representative in your locality or write:

LINDBERG ENGINEERING COMPANY

2452 West Hubbard St., Chicago 12, Illinois

Los Angeles Plant: 11937 S. Regentview Ave., at Downey, California.

heat for industry

How 689 Mills Cut Bearing Cost Per Ton Of Steel Rolled

By mounting roll necks on Timken® tapered roller bearings, a rapidly increasing number of steel mills keep production high, downtime low, and hold bearing cost per ton of steel rolled at rock bottom. Here's why:

1. **LONGER BEARING LIFE.** Tonnage records from hundreds of mills demonstrate that the long life of Timken bearings on mill roll necks holds bearing cost per ton of steel rolled, to a minimum.

2. **BETTER MILL RIGIDITY.** Timken roll neck bearings have a unique balanced proportion design that lets you use larger roll necks than ever before possible with tapered roller bearings.

3. **SIMPLIFIED LUBRICATION.** You don't need complicated lubricating systems when you use Timken roll neck bearings. They permit use of simpler, less expensive grease lubrication.

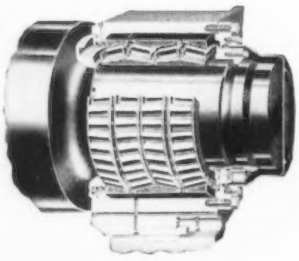
4. **HIGHER LOAD RATINGS.** Balanced proportion design provides up to 40% greater bearing capacity than previous designs for a given mill roll size.

5. **SPECIAL THRUST BEARINGS ELIMINATED.** Because Timken bearings are designed to take *both* radial and thrust loads, they save you the extra cost of special thrust bearings.

6. **STEEL LOSS ENDED IN MILL STOPS AND STARTS.** With mill roll necks mounted on Timken tapered roller bearings, you can start your mills under full load—and end unnecessary loss of steel.

7. **FASTER MILL ROLLING SPEEDS.** Because Timken bearings are designed with true rolling motion and practically eliminate friction, your mills can roll at higher speeds than otherwise possible.

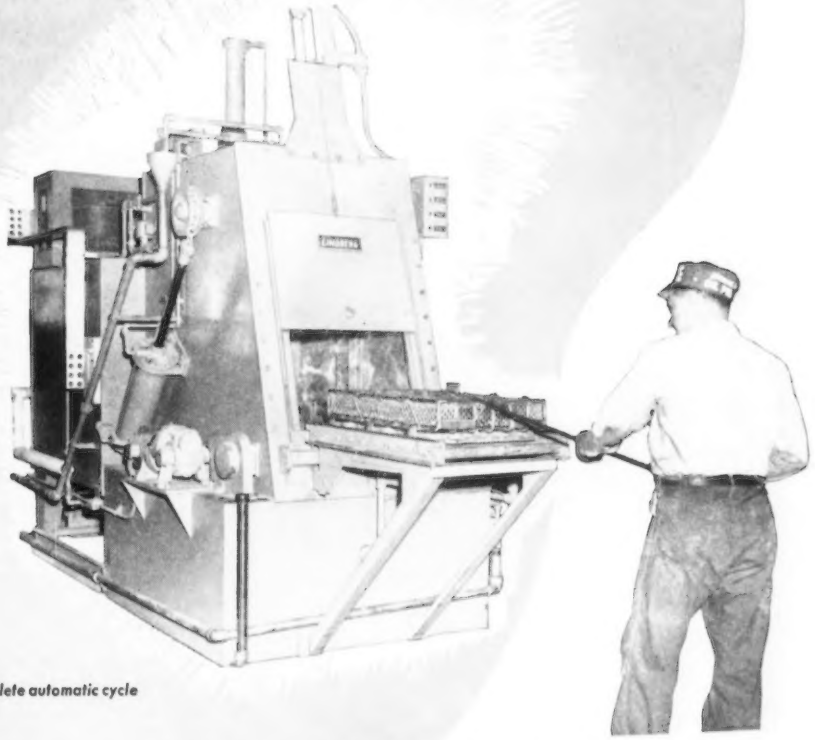
You can get all these advantages in existing or new equipment when you specify Timken tapered roller bearings for your back-up and work rolls. Get complete details from our specialists. Just call or write The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable: "TIMROSCO".



TIMKEN® TAPERED ROLLER BEARINGS ROLL THE LOAD

Here's the work-horse

for many a carbonitriding job



This furnace has complete automatic cycle and quench control.

This is the most widely-used carbonitriding furnace of all. Day in and **day out production of** tons and tons of work has proved this furnace's **ability to increase** production quality and volume and reduce costs. It **is a versatile** furnace, too, not only for carbonitriding but for other uses, carburizing, annealing, carbon restoration and many hardening applications.

This type of furnace is available for both manual and automatic operation. It can be equipped either with Lindberg's efficient new vertical radiant tubes for fuel-firing or for electric heating with Lindberg's revolutionary new CORRTHERM element.

Versatile as this furnace is, we don't claim it is the best solution to *every* carbonitriding problem. But, whatever your need may be, talk it over with Lindberg. Our engineers, as they have done in so many instances, will recommend a sound answer—design it, build it, even field-install it if you wish. Just get in touch with the Lindberg plant or the Lindberg Field Representative in your locality. Lindberg Engineering Company, 2452 West Hubbard St., Chicago 12, Illinois. Los Angeles Plant: 11937 S. Regentview Ave., at Downey, California.

LINDBERG

heat for industry

It's your final cost that counts when you buy stainless steel plate and plate products

Don't be misled by the "lowest quote"—not if you want quality stainless steels with the lowest *final* cost in your shop. Put your confidence in the supplier who gives you *what* you want, the *way* you want it, *when* you want it.

At Carlson, for example, your order is filled by experienced men who take a personal interest in it.

- You save true-up time—plates are sheared square and accurate
- You save assembly time—all machined pieces are right to your print
- You save freight and scrap handling costs—pieces are properly cut to sketch
- You can deliver on schedule and get repeat business

Remember, it's your *final* cost that counts. When you want stainless steel for your next job—put Carlson to the test.

G.O.CARLSON Inc.

Stainless Steels Exclusively

C

THORNDALE, PENNSYLVANIA

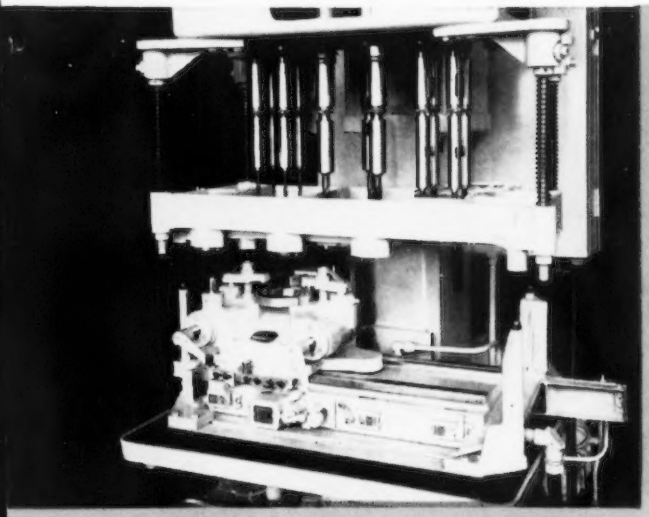
District Sales Offices in Principal Cities

PLATES • PLATE PRODUCTS • HEADS • RINGS • CIRCLES • FLANGES • FORGINGS • BARS and SHEETS (No. 1 Finish)

Natco Naturals

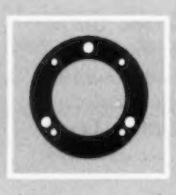
Cost-Cutting Ways
You Can Use
Standard Multi-Spindle Natcos

Any time your parts require machining *more than one hole*–drill, bore, face or tap–it may well be a "Natco Natural." Your standard Natco will produce substantial savings in a surprising number of situations, *even in small job-shop lots!* Call in your nearby Natco field engineer; he'll tell you in short order whether you've got a "Natco Natural" there.

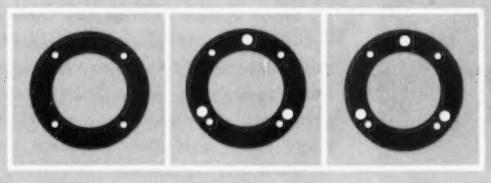


Multiple Drilling Operations on One Part-Face

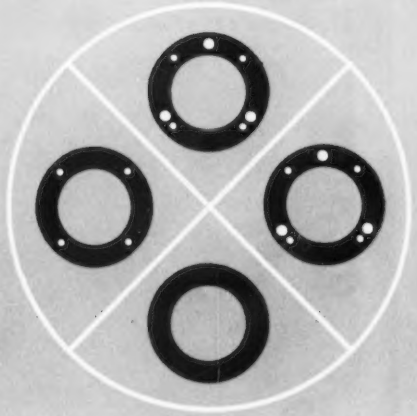
Straight-line indexing *on a Natco H6 produces 49 parts per hour. 4 holes drilled in first position, 3 holes drilled in second position, 4 holes c'bored in third position. One part completed every three strokes. Automatic cycling frees operator for other work. Illustrations below show three other ways of handling this part.*



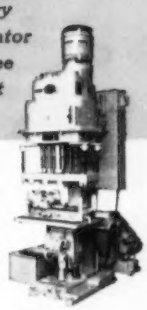
45 parts per hour. *Inexpensive box jig. Operator positions jig under appropriate spindles. One complete part for 3 strokes of machine.*



75 parts per hour. *3-position fixture. Operator shifts parts after each stroke. One part completed every stroke.*



155 parts per hour. *Rotary 4-position index table. Operator unloads and loads while three operations proceed. One part completed every stroke.*



Standard multi-spindle Natcos *range from 1 hp, 10-spindle machines to 25 hp machines with up to 72 spindles. Spindles in standard Natcos are driven through universal joints and located by either adjustable arms or bored slip plates.*

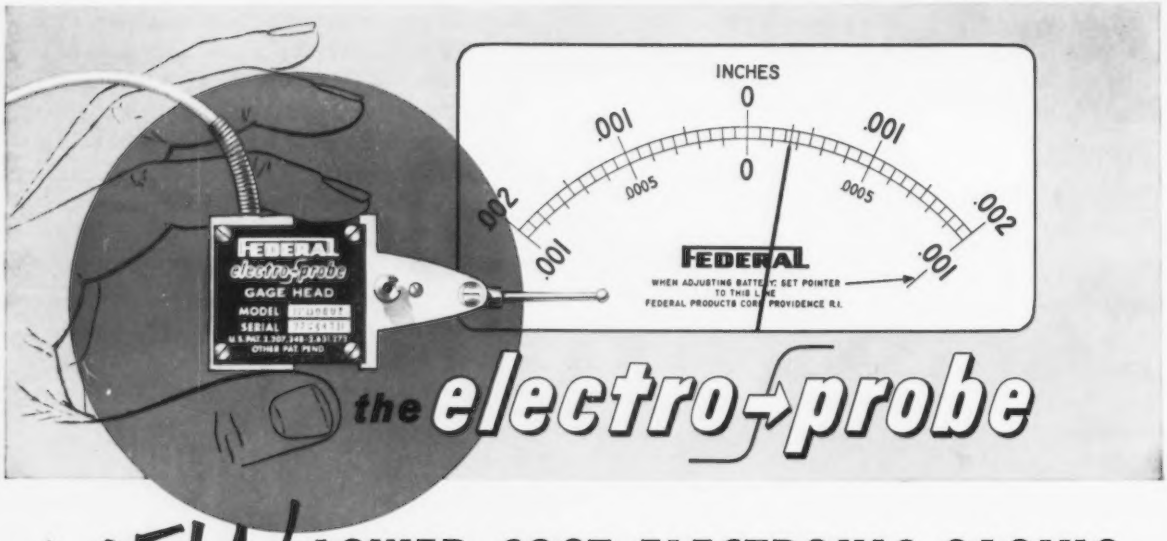
NATCO

National Automatic Tool Company, Inc.

Richmond, Indiana

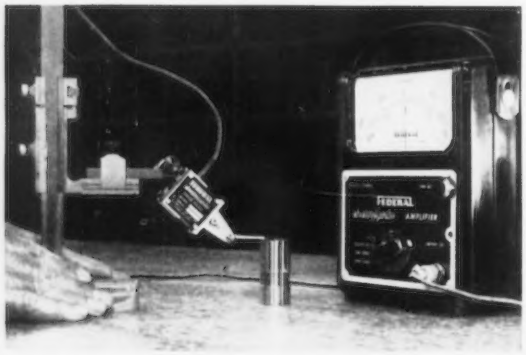
Multi-spindle drilling, boring, facing & tapping machines. Special machines for automatic production.

Call Natco Offices in Chicago, Detroit, New York, Buffalo, Boston, Philadelphia, Cleveland, Los Angeles; distributors in other cities.



NEW LOWER COST ELECTRONIC GAGING

The new Electro-Probe Model 230 P-2 introduces a new concept in Dimensional Control. It is far more than just another electronic test indicator.



1. Take it anywhere. Model 230 P-2 is completely portable and self-contained. It consists of a bantam size electronic gage head and transistor amplifier which, with metal carrying case and accessories, weighs only 8½ lbs. It is completely independent of external power, and electrical parts are hermetically sealed.

2. Mount it on any conventional fixture. No special stand or holding fixture is required because gaging pressure is extremely light (less than 2.5 grams). Supports which would deflect under even normally light gaging pressures remain rigid when the Electro-Probe is used. And the gaging pressure remains constant throughout range (change is less than 0.1 gram per .001″).

3. Set it up in a jiffy. Now you have Precision *without* time-consuming adjustments. Master it anywhere within its range because response is so linear. Full scale Zero Adjustment makes positioning easy and fast. Warm up time is virtually zero. Gage when *you're* ready!

4. Gage with ease and assurance. Contact has friction-free travel of ± .015″. Clutch mounting allows head to be placed in almost any position and provides complete over-travel protection. Either of two magnifications instantly available. Wide 4½″ dial easy to read.

5. Enjoy greater reliability than ever before. Use of **Printed circuits** and **transistors** means trouble-free performance. Connections are sure, operating current amazingly low — no heating or voltage regulation problems, no dependence on electrical outlets. Learn more about this truly portable, reliable, accurate and versatile gaging device.

Write for Literature.

FEDERAL PRODUCTS CORPORATION
71312 Eddy Street • Providence 1, R. I.

Packaged for convenience

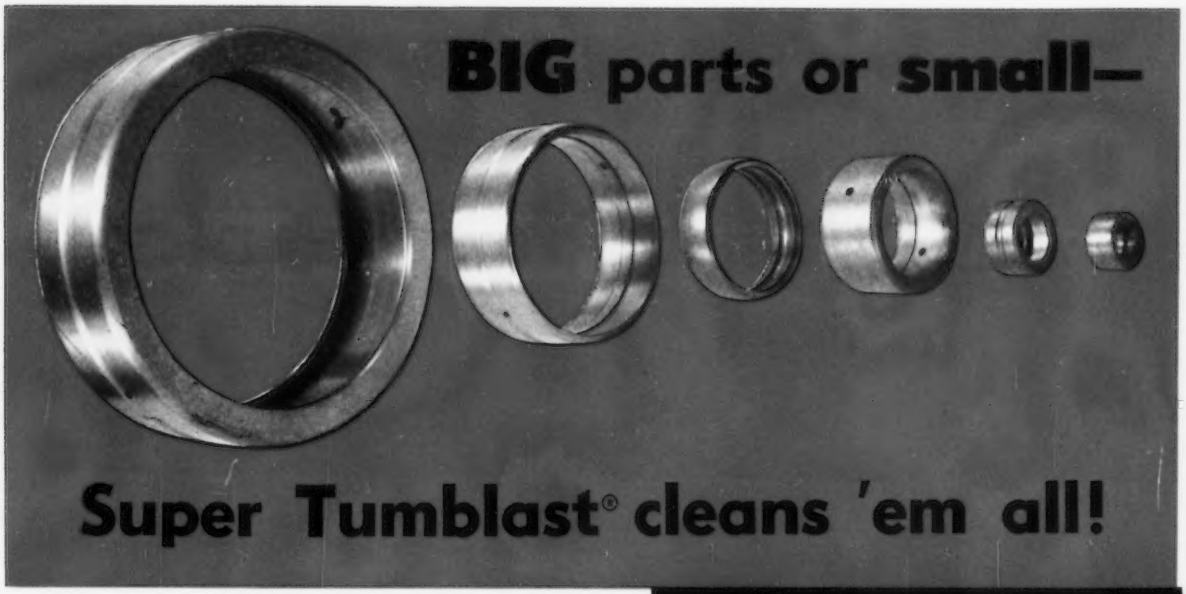
Electro-Probe gage head, self-powered amplifier and accessories, all in one lightweight case . . . easily carried from job to job.

The Electro-Probe principle has exciting advantages in other fields of gaging. Ask us.

Ask **FEDERAL** *First*

FOR RECOMMENDATIONS IN MODERN GAGES . . .

Dial Indicating, Air, Electric, or Electronic — for Inspecting, Measuring, Sorting, or Automation Gaging



Removing heat treat scale from bearing components at McGill Manufacturing Company, Valparaiso, Indiana, involves the high-volume cleaning of parts ranging from 12" to only ½" O.D. Whereas cleaning the smaller parts in standard batch-type equipment necessitated placing them in baskets to prevent jamming, a Wheelabrator Super Tumblast eliminates this costly, time-consuming operation. At the same time, other important super-savings in cleaning costs are being effected.

The Wheelabrator Super Tumblast handles twice the load per cleaning cycle, in one-third the time formerly required. Man hours for this operation have been cut in half and the work force reduced by one man. And the automatic features of this new airless blast cleaning machine permit it to operate without a full time operator for further savings.

A heat-treated McGill bearing raceway, before and after descaling. The Super Tumblast removes all the scale, even from the inner surface.

Wheelabrator airless blast cleaning is producing similar savings for users in many industries. Operating at cost-reducing speeds, Wheelabrators regularly turn out superior work at lower cost. Wheelabrator engineers will suggest specific methods and equipment to solve your cleaning problems.

WHEELABRATOR®

CORPORATION

510 South Byrkit St., Mishawaka, Indiana

Cost-cutting features of the Wheelabrator Super Tumblast are described in Catalog 132-D, free on request.

WORLD'S LARGEST MANUFACTURER OF AIRLESS BLAST CLEANING EQUIPMENT

What is the BIGGEST

Here's LeBlond rigidity in action at Alliance Tool & Die Corp., Rochester, N. Y. The part is a 6500 lb. molybdenum steel compressor wheel. 32 micro finish and ± .001", minus .000" critical tolerance on bore, recess and hub!

workpiece your lathes can turn?

Probably your lathes will swing a 32″ piece. Or 40″. But what happens when that occasional 50″ or 60″ job comes along? Chances are you have to say, "We can't handle it. After all, how can you justify a big swing lathe, just for a few big jobs a year?"

Today there *is* a practical and economical solution to this odd-size work problem. LeBlond Sliding Bed Gap Lathes.

Our 32″/60″ Heavy Duty will accommodate work up to 60″ diameter! Basically this is a 32″ lathe. But it has an extendible bed (an upper bed that slides on a lower bed). Slide it to the right, and a gap opens. Now, you have a full 60″ swing! Also, for extra long work, there is 50% greater center distance. And the rest of the time you have a regular 32″ heavy duty lathe for a wide variety of work.

3 lathes in one—at the cost of a lathe and a half!

Here's an example of how this extra capacity pays off. Alliance Tool and Die Corp., Rochester, N. Y. are specialists in unusual machining problems, like precision molds—and the bulky compressor wheel, shown here. How did they turn it before? They didn't. The part was too big. Now, with their 32″/60″ LeBlond (recommended by Macaulay Machinery Co., Rochester, N. Y.,) they take jobs like this right in stride. Actually, this particular order was made possible by this lathe.

If you do job shop work, you can consider this lathe a business-getter. If you're doing your own maintenance, it gives you the capacity to do virtually all your own turning work. LeBlond Sliding Bed Gap Lathes are available in 4 sizes—16″/38″, 25″/50″ and 32″/60″ (shown) Heavy Duties and the 17″/28″ Regal. You're sure of getting the right lathe for your job when you buy LeBlond. There are 76 lathe models to choose from. Call your LeBlond Distributor or write.

Here's how the LeBlond Sliding Bed Gap Lathe gives you extra capacity for extra large work:

BED GAP CLOSED—*functions as a regular 32″ lathe.*

BED GAP OPEN—*full 60″ swing.*

BED FULLY EXTENDED—*50% greater center distance.*

. . . cut with confidence

THE R. K. LEBLOND MACHINE TOOL COMPANY
Cincinnati 8, Ohio

LEBLOND *of Cincinnati*

World's Largest Builder of a Complete Line of Lathes for More than 71 Years

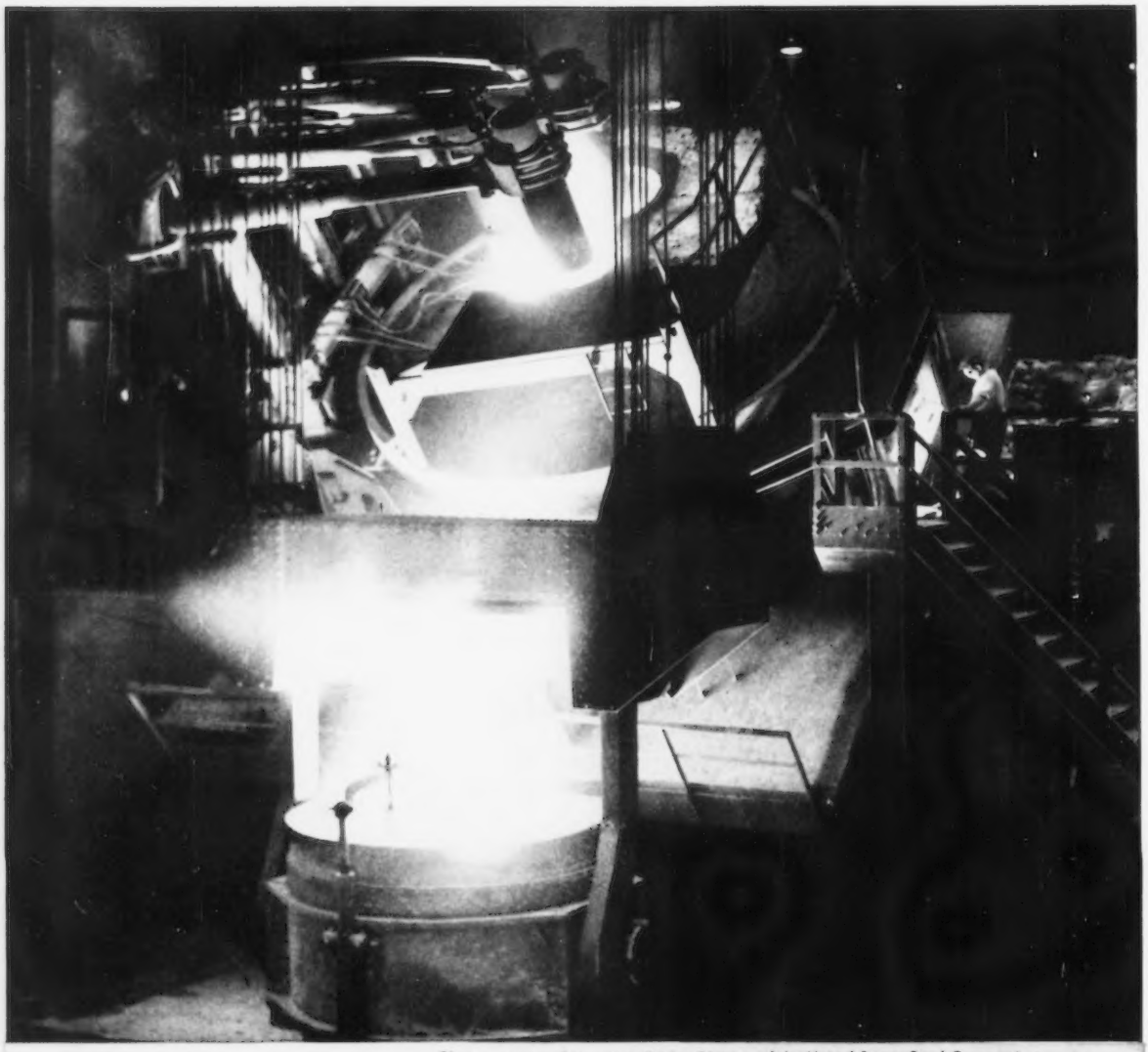


Photo courtesy of American Bridge Division of the United States Steel Corporation

BAKER'S MAGDOLITE AND JEBCOLITE
are always 5 ways better

Continued research and development throughout the years, plus The J. E. Baker Company's precisely controlled manufacturing methods, have resulted in the superior, properly burned, grain-sized Magdolite and Jebcolite particles which help provide:

More uniform ingots—increased ingot production—increased furnace efficiency—lower refractory costs—less defective production material.

Magdolite and Jebcolite* are the *original* dead-burned dolomites that offer better composition, preparation, strength, economy and quality. Don't say "dolomite." Save dollars. Specify Baker's Magdolite for open hearth and Jebcolite for electric furnace use.

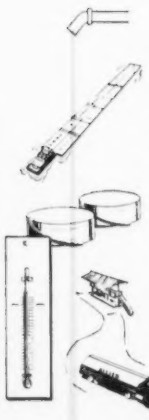
**Jebcolite has the same superior chemical, physical and mineralogical characteristics as Magdolite and differs only in grain size which is designed specifically for electric furnace application.*

JEBCO
PRODUCTS
SINCE 1889

THE J. E. BAKER COMPANY
YORK, PENNSYLVANIA
PLANTS: BILLMEYER, YORK, PENNSYLVANIA — MILLERSVILLE, OHIO

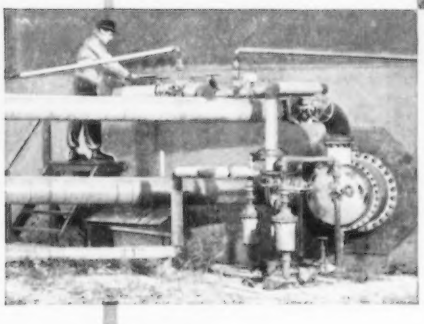
ninety in the shade - or ten below zero...

ALLIED DELIVERS THE FUEL OIL YOU NEED



ALLIED STEP-BY-STEP TEMPERATURE CONTROL

— keeps heavy fuel oil free-flowing, easy to handle... from terminal to users' storage tanks ... regardless of weather conditions.



Suction heaters, capable of raising temperature of heavy fuel oil by as much as 90° at a rate of 500 gallons per minute, automatically bring oil up to required truck loading temperature, make certain of sufficient "temperature hold" for oil in transit ... insure quick unloading at delivery point.

WHEREVER YOU NEED IT — WHENEVER YOU WANT IT

Let it blow, snow or freeze — Allied will deliver the exact grades of fuel oil you need — in full — and on time.

Strategically located for quick short-haul deliveries, Allied storage terminals are completely equipped to receive incoming shipments quickly and efficiently — to maintain oil in storage in free-flowing condition for fast, uninterrupted loading at the terminal — and equally important, to insure quick, easy handling at the storage tanks of fuel oil users.

To meet any fuel oil requirement, call the Allied representative.

FUEL OIL FOR THE HEART OF INDUSTRIAL AMERICA

ALLIED OIL COMPANY

A DIVISION OF ASHLAND OIL & REFINING CO

1700 Standard Building • Cleveland 13, Ohio

TAKE A TIP FROM VICTOR

(You'll be glad you did)

SELECT FROM MORE THAN 35 TYPES, SIZES FROM 000 TO 16

No matter what your cutting needs — from light preheating to heavy underwater cutting — there's a right Victor tip for each job.

PRECISION MADE — Specially designed machines and time-proven methods, developed during Victor's 40 years of tip manufacture, assure you consistent, efficient performance from each tip. Carefully proportioned preheating and cutting orifices, accurately finished on polished mandrels, produce free-flowing gas jets which enable you to use lower, more economical gas pressures. Exactly machined tapered seats assure absolutely gas-tight fit in Victor Cutting Torches. Finally, each Victor cutting tip is flame tested to insure you perfect flame and cutting jet characteristics.

Why work with misfit or "bootleg" tips? Get the right Victor cutting tips for your jobs NOW from your Victor dealer.

WRITE FOR FREE TIP SHEET

VICTOR for welding

Pictures and describes complete line of Victor cutting tips, tells what Victor torches each fits. Just ask for Cutting Tips Bulletin 314.

43

VICTOR EQUIPMENT COMPANY

Mfrs. of welding & cutting equipment, hardfacing rods, blasting nozzles, cobalt & tungsten castings, straightline and shape cutting machines.

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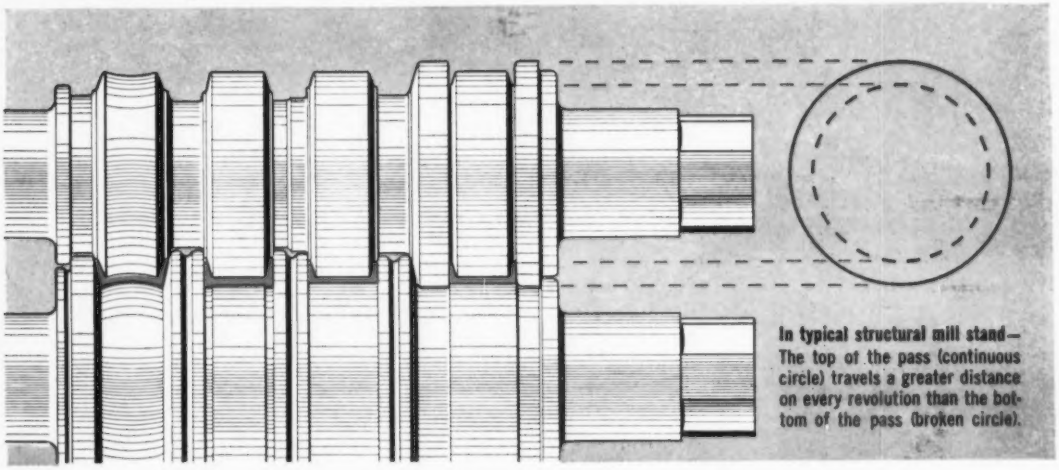
TIPS FROM A ROLL MAKER'S NOTEBOOK

MACKINTOSH-HEMPHILL DIVISION, E. W. BLISS COMPANY, Pittsburgh 3, Pennsylvania

Cast mill rolls • Johnston cinder pots • rotary tube straighteners • end-thrust bearings • heavy-duty lathes • steel and special alloy castings

You get your nickel's worth in structural rolls



In typical structural mill stand— The top of the pass (continuous circle) travels a greater distance on every revolution than the bottom of the pass (broken circle).

With the large rolls used in beam, channel and other structural mills, excessive side wear in the passes is probably the most common cause of short runs between redressings. The reason, naturally, is the variation in peripheral speed at various pass depths. For example, the top of a typical pass on a 26" diameter roll may travel as much as a foot more on each revolution than the bottom of the pass. The slippage that has to occur aggravates this side wear in the passes.

Thus, structural finishing rolls should be as hard as practical, with the hardness uniform from the surface in. While Mack-Hemp produces several types of rolls widely used in structural mills, the one which offers the best wearing properties—and the one we recommend for all large mills where wear is severe—is the nickel-alloy steel "M-H Midland Supermetal" roll.

The three virtues of nickel—The more carbon in steel, the higher its hardness can be raised by heat treatment. But, carbon also raises brittleness. Strength and resistance to shock and impact suffer.

However, as nickel is added, the strength of the steel increases. Thus, the introduction of nickel raises the permissable level of carbon, since the nickel counterbalances the embrittling effect of the carbon.

Because of its graphitizing property, nickel contributes two other virtues to the "Supermetal" roll. The graphite acts as a lubricant, reducing the rate of wear caused by the slippage in the pass. Secondly, the graphite formed due to the presence of nickel is very fine and well-dispersed, producing a structure that provides a smooth working surface.

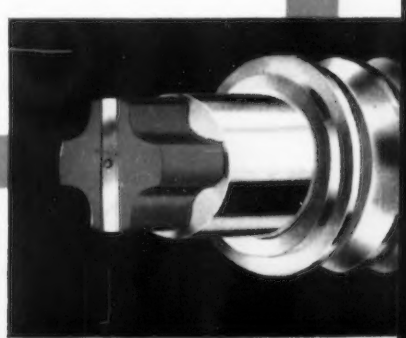
The greatest wear resistance—Because of these properties conferred by nickel, Mack-Hemp "Supermetal" represents the best solution yet found to the wear problem created by severe operating conditions in structural mills. However, several other Mack-Hemp roll compositions give excellent results where conditions are less severe. For more detailed information on this—or any other—problem of roll selection, telephone or write us today. There's no obligation.

MACKINTOSH-HEMPHILL

You get more tonnage from the rolls with the Striped Red Wabblers

Division of E. W. BLISS COMPANY

Presses, Rolling Mills, Special Machinery



. . . how else could this job be handled so well?

Through exclusive features like these a Gerlinger fork lift truck enables each operator to multiply "manpower" and give you a new concept of profitable mass-handling:

- Exclusive Floating-Type Boom Action – faster, friction-free lift
- Counter-active Weight Distribution – better traction and maneuverability
- Pivotal Mounted Steering Assembly – stabilized load on any road
- Heavy-Duty Steel Channel Frame – bonus years of reliable service
- Maximum-Power Torque Converter Drive – smoother operation, less wear

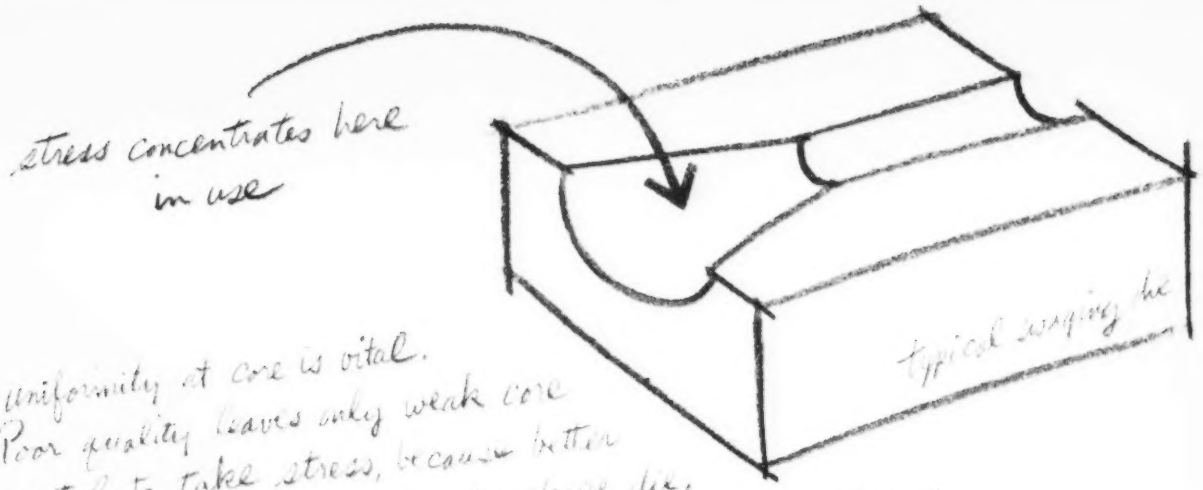
If you move and stack loads between a few hundred pounds and twenty tons, look to the combined Towmotor-Gerlinger line to meet the most diversified specifications. This great new combination brings you the most complete range of fork lift truck capacities available from one source. More extensive service to match it, too.

Get catalog describing the lift trucks that will do the best job for you. Address: Gerlinger Carrier Co., Dallas, Oregon.

Leaders for 38 years in building Fork Lift Trucks and Carriers

TOWMOTOR – GERLINGER
THE ONE-MAN-GANG

Gerlinger Carrier Company, Dallas, Oregon is a subsidiary of Towmotor Corporation, Cleveland, Ohio



uniformity at core is vital.
Poor quality leaves only weak core
metal to take stress, because better
surface metal is cut away to shape die.
Mel-Trol alloys, uniform throughout, eliminate weakness,
broken dies, too-rapid wear resulting from
poor centerline quality often found in ordinary steels.

. . . produces the first alloys with really predictable performance right through the core

Until now, it's never been possible to look at the alloy bar and be sure its center is as sound as its surface. Sometimes centerline weakness won't show even in a cross section. But it *will* show in rejects, breakage, rapid wear. The swaging die illustrated is just one example.

Carpenter Mel-Trol alloys are the answer to problems involving core quality. They are completely uniform, free from segregation, porosity and center separation. Carpenter's exclusive Mel-Trol process is the reason.

Mel-Trol is an integrated system of quality controls using patented Carpenter-developed equipment and methods supplemented by the most modern equipment commercially available. Mel-Trol is a part of the steel-making process from scrap selection through final preparation of stock shapes. It is the only process ever successful in producing truly uniform specialty alloys in mill lots.

There's a Carpenter service representative near you who'll be glad to show you how Mel-Trol alloys are ending reject problems, producing improved tools and parts for many famous metalworking companies. You can do the same. Call him today.

Carpenter

The Carpenter Steel Company, 121 W. Bern St., Reading, Pa.
Export Dept.: The Carpenter Steel Co., Port Washington, N. Y.—"CARSTEELCO"

Pioneering in improved specialty steels through continuing research

ALCOA'S NEW COLOR MOVIE

2011-T3

Here's the "Lightweight Champion of the Machining World." Watch this free-machining aluminum alloy perform amazing feats of economy and versatility through a blizzard of fine, crisp chips. It's just the ticket for most screw machine products.

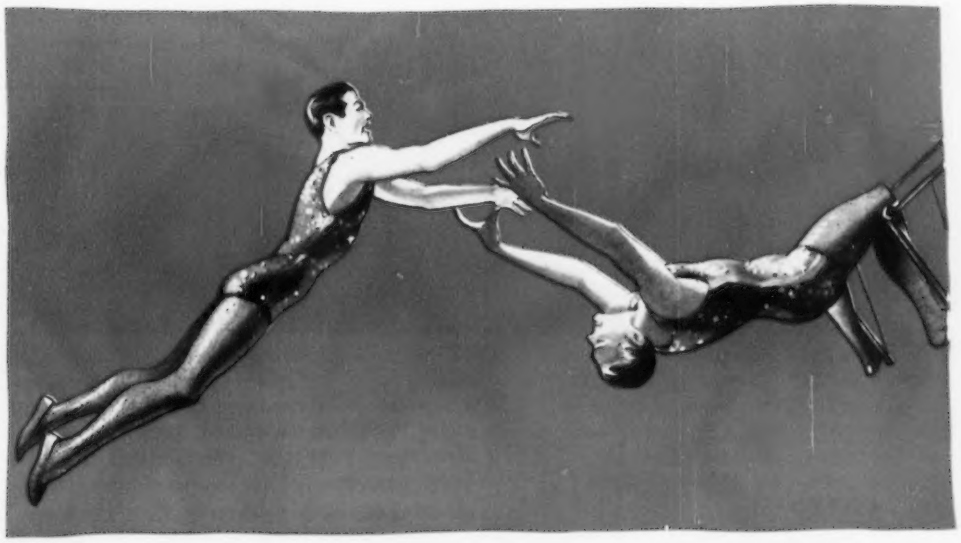
6061-T6

The fabulous alloy that's unequaled where service calls for exceptional resistance to corrosion, suitability for welding or brazing. It's the most finishable of the aluminum screw machine stock alloys.

FREE SHOWING

Be sure to see these amazing alloys perform their spectacular feats of strength, economy, machinability, finishability and corrosion resistance. Determine a date for a showing to your group and contact your nearest Alcoa sales office. They'll confirm a show date for you and send the film to reach you in time for your meeting. No charge. Aluminum Company of America, 870-M Alcoa Building, Pittsburgh 19, Pennsylvania.

"THE FOUR AMAZING ALLOYS" DEMONSTRATES THE VERSATILITY OF ALCOA ALUMINUM SCREW MACHINE STOCK



2024-T4

The daring "Aircraft Alloy." Noted for its strength. Tops where tight, vibration-, strain- and wear-proof assemblies are a must.

2017-T4

The startling alloy that's priced lowest of the aluminum screw machine stock alloys. Handles tough service jobs with a high degree of machinability.

Your Guide to the Best in Aluminum Value

ALCOA ALUMINUM

NEW! "ALCOA THEATRE"
EXCITING ADVENTURE
ALTERNATE MONDAY EVENINGS

Learn why leading companies have switched to Alcoa Aluminum Screw Machine Stock

ALUMINUM COMPANY OF AMERICA
870-M ALCOA BUILDING, PITTSBURGH 19, PENNSYLVANIA

Please send booklet with direct quotes from industry leaders on why they buy from Alcoa.

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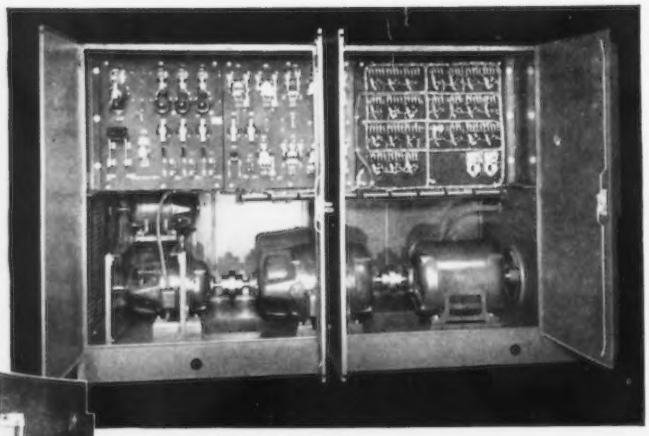
COMPANY .....

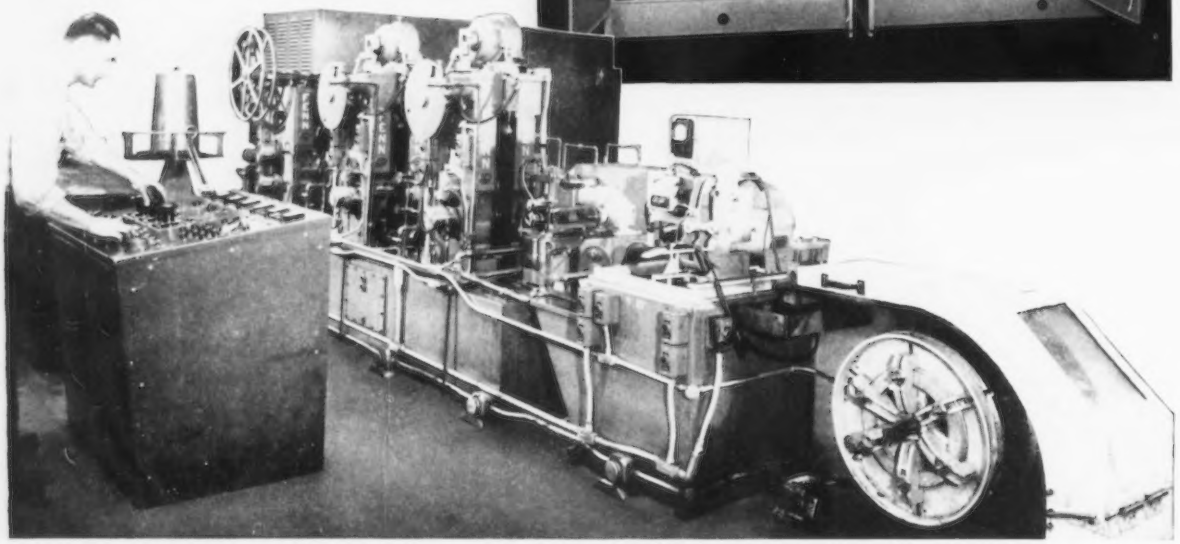
ADDRESS ..... CITY ..... STATE .....

NOW–CLARK-ENGINEERED adjustable speed drives *IN A PACKAGE*

CLARK "PSC"

(PACKAGED SPEED CONTROL)





For more than 20 years Clark has pioneered in the field of adjustable voltage DC control systems. Since 1934, our company has been a major supplier of specially engineered control for processing lines in the basic metals, rubber and plastics industries, where the advantages of adjustable voltage DC systems have long been recognized.

Now Clark "PSC" (Packaged Speed Control) incorporating the knowledge and experience gained by Clark engineers over the years, is available in compact, factory-assembled units in attractive pressure ventilated cabinets that fully protect the equipment and occupy a minimum of plant floor space. "PSC" Drives include the conversion equipment for changing AC to DC, panel mounted control equipment and separately mounted pilot devices, as well as DC drive motors.

Clark will either supply the drive motors, recommend proper motors, or design the "PSC" for motors owned or supplied by the customer.

"PSC" permits adjusting drive speed over a wide range by controlling motor armature voltage and or field current. Modifications may be incorporated to adapt "PSC" to an almost limitless variety of applications where controlled-speed DC drives are advantageous.

Illustration shows a modern 3-stand tandem wire flattening mill with the individual stand drives synchronized electrically by Clark "PSC". Compared to similar machines in the same plant with mechanical synchronization, this mill is five times faster with more precise speed and tension control. Thus it holds closer tolerances and reduces breakage of light material.

***Write** for your copy of this booklet, telling you the Clark "PSC" story.*

The CLARK CONTROLLER *Company*

Everything Under Control

1146 East 152nd Street • • Cleveland 10, Ohio

IN CANADA: CANADIAN CONTROLLERS, LIMITED • MAIN OFFICES AND PLANT, TORONTO

Reduces Machining Time

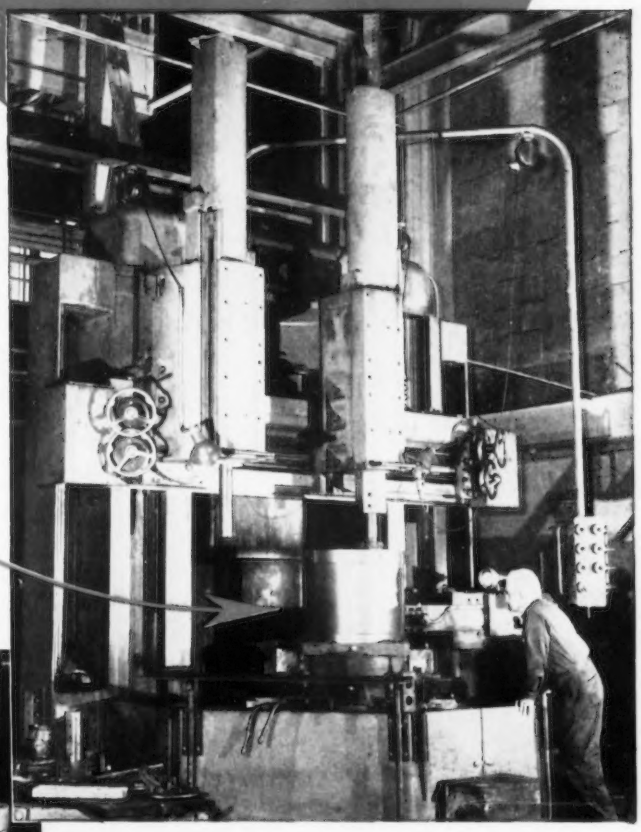
with

BULLARD

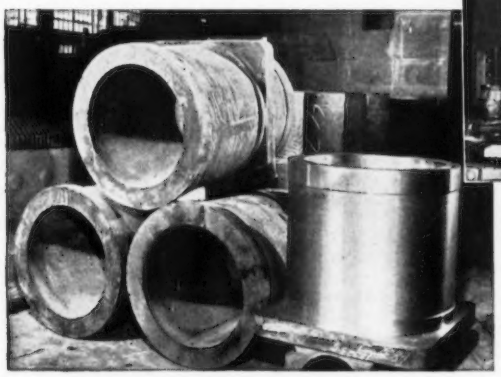
35% OVER EARLIER MODEL

Cut Master
VERTICAL TURRET LATHE
MODEL 75

In the machining of a barrel housing used in a large mechanical press, manufactured by the Clearing Machine Co., Chicago, Ill., Mr. L. W. Prochnow, Factory Manager says "our 66" Cut Master, Model 75 is a big, husky machine. Its heavier rams, overall rugged construction and greater horsepower provide higher speeds and feeds easily controlled from the movable Pendant. These features enable us to cut our floor to floor time, per piece, by four hours. And we've had no maintenance problems in nearly two years of operation." These same cost savings can be applied to your machining problems when considering replacement or additional capacity in your plant.



From rough casting, weighing 1,780 lbs., 28" in diameter and 36" long, to finished piece with a 35% saving in machining time.



to cut costs
when cutting metals –
buy BULLARD

Our nearest Sales Office or Distributor will be glad to show you how or write for complete catalog to

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BRIDGEPORT 9, CONNECTICUT

Products Unlimited . . .

that's what you have with the use of steel—not steel products alone necessarily, but steel to make literally thousands of products better. American Steel & Wire has been a wire maker to the nation for over 125 years. This experience has resulted in a know-how that is relied upon by manufacturers who use American Steel & Wire's quality steel to produce better products every day in every way.

Shave after shave after shave

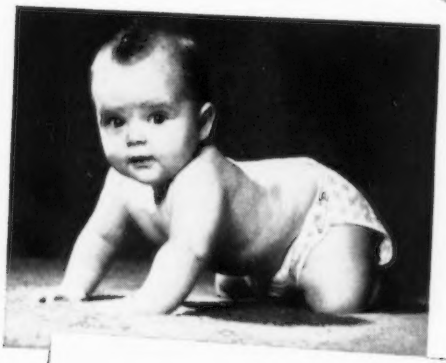
Get a clean shave and your day is off to a good start. But, to get a clean shave, your blade must be sharp. American Steel & Wire makes razor-blade steel that takes a sharp edge—an edge that stays sharp, shave after shave after shave.

USS AMERSTRIP
COLD ROLLED STRIP STEEL

With the greatest of ease

Even without a trapeze, you can float through the air with the "greatest of ease"—if you use this unique diving trampoline which derives its bounce from quality-engineered USS American Springs. This is just one of many manufacturing applications of springs which are designed, produced and tested by American Steel & Wire.

USS AMERICAN
QUALITY SPRINGS



The Indispensable Pin

Styles in diapers change. What used to be a plain white triangle is often a flowered square today. However, you'll find the old reliable safety pin still the key item in this little lady's apparel . . . its use doesn't change. Each year, American Steel & Wire makes thousands of miles of high-quality wire for use in safety pins, bobby pins, hairpins.

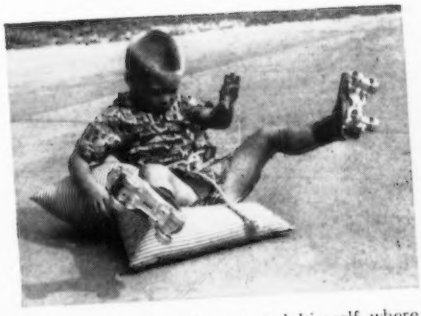
USS AMERICAN
MANUFACTURERS WIRE

DEEP SLEEP

Everybody's talking about getting a good night's sleep. American Steel & Wire is helping to do something about it by supplying the best spring wire available to leading bedding manufacturers. Inner springs made from Premier Spring Wire "give" just enough to cradle a person comfortably and lure him into a deep sleep.

USS PREMIER
SPRING WIRE

Protection!



Fortunately, this lad protected himself where he is vulnerable. Production Departments could take a tip from him and forearm themselves against machining problems by using American Steel & Wire's Amer-Led. With this leaded steel, there are fewer rejects, closer work tolerances, longer tool life. As an example, Franz Manufacturing Co. increased their machining speed 17.4% with the use of Amer-Led for the axle-and-bearing cones of the roller skates shown here.

USS AMER-LED
COLD FINISHED BARS

USS

AMERICAN STEEL & WIRE
DIVISION
UNITED STATES STEEL

Over 125 years experience in wire making

We invite you to send for a free booklet which lists conveniently some of the 80,000 different items our plants produce. American Steel & Wire, Dept. 842, Rockefeller Bldg., Cleveland, Ohio.

Tension strapping to 3900 pounds fast with New Signode Power Stretcher

Here's the heavy-duty power stretcher you'd expect from Signode—

- . . . Get any preset tension—3900 lb. at 120 psi., 2100 lb. at 60 psi.
- . . . Tensions Signode steel strapping, dry or waxed, up to 1¼ x .050.
- . . . Exclusive rolling gripper makes it easy to disengage the strap and greatly increases tool service life.
- . . . Tested and proved in 1½ years of actual service.

For complete details and a demonstration, call the Signode man near you, or write:

SIGNODE STEEL STRAPPING CO.

2623 North Western Avenue, Chicago 47, Illinois

Offices Coast to Coast. Foreign Subsidiaries and Distributors World-Wide.

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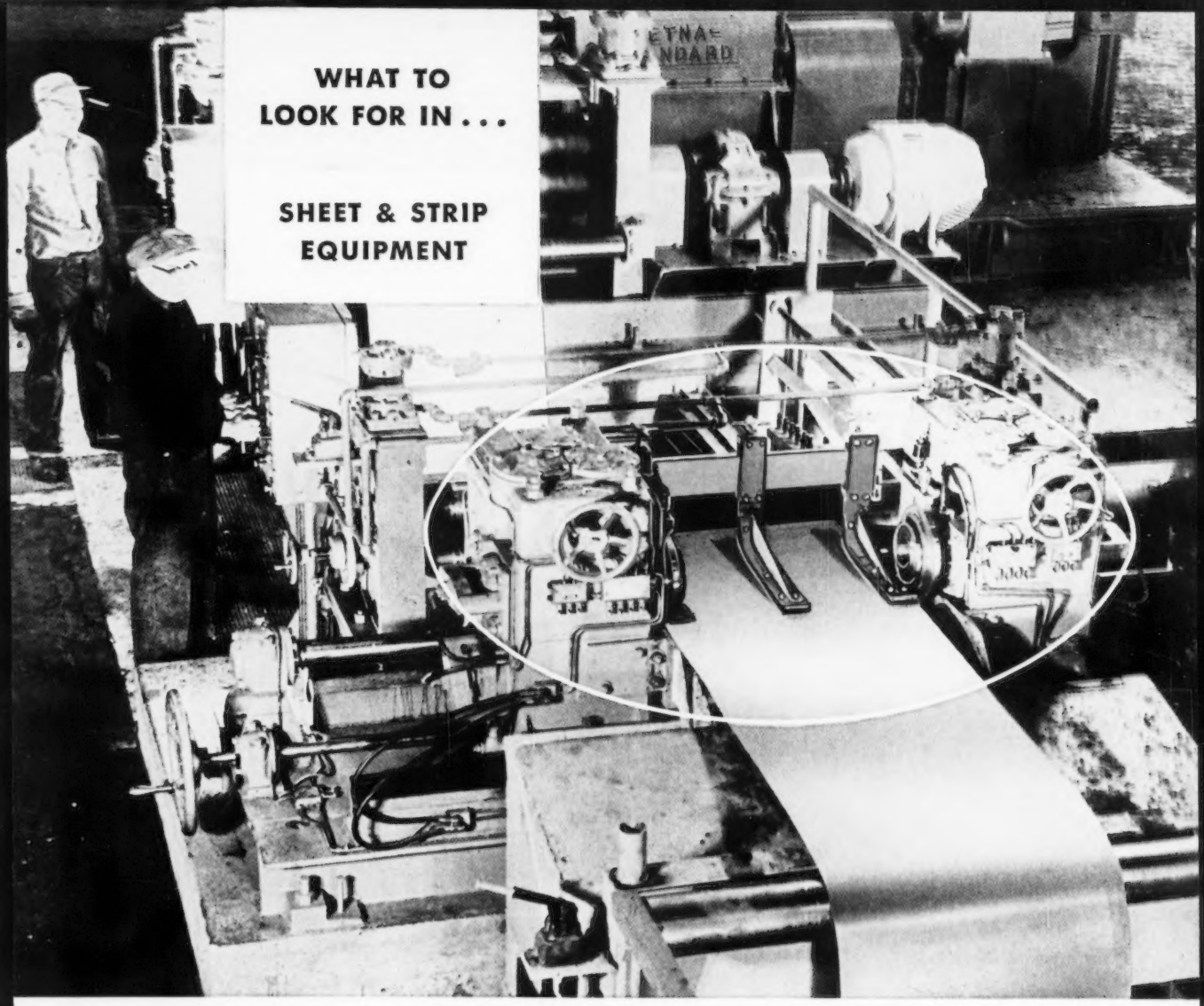


there's a DIFFERENCE in SLITTERS . . .

Easy Adjustment

Each top spindle arranged for vertical adjustment.

Each spindle can be accurately set by screw adjustment for knife-side clearance.

Micrometer adjustment by worm and gear reduction in setting the vertical knife clearance.

Housings can be adjusted for various widths of strip.

Positive right-angle alignment of the rotary knives with strip.

Handwheel adjustment for upper chuck located where operator can see knife clearance.

Easy Operation

All spindles driven by single helical gears of heat-treated alloy steel.

On many sizes, housings of high-speed tin-plate side trimmers tilted to assure side scrap removal from strip, preventing scrap cobbles.

Maintenance

Bearings serviced by centralized lubrication.

Improved oil seal arrangement provided for trimmer housings.

Good Construction

All internal parts housed in two cast-steel housings with oil seals to retain bearing lubricant.

Knives of high-carbon, high-chrome forged steel of double-edge reversible type.

Spindle housings and drive carried on heavy welded structural steel base.

Two-point support included for each upper chuck.

Mill-type shoe design assures proper alignment of housings for trimmer.

Four driven spindles of alloy steel forgings carried in two double rows of anti-friction bearings.

AETNA • STANDARD

THE AETNA-STANDARD ENGINEERING COMPANY

GENERAL OFFICES: PITTSBURGH, PA. • PLANTS: ELLWOOD CITY, PA., WARREN, OHIO • PROCESS LABORATORY: AKRON, OHIO

CONTINUOUS GALVANIZING LINES • CONTINUOUS ELECTROLYTIC TINNING LINES • SIDE TRIMMING AND SHEAR LINES AND OTHER FINISHING EQUIPMENT • CONTINUOUS BUTT WELD PIPE MILLS • SEAMLESS TUBE MILLS • DRAWBENCHES AND OTHER COLD DRAW EQUIPMENT • ROLLS AND CASTINGS • EXTRUDERS, MILLS, PRESSES FOR RUBBER AND PLASTIC

GENERAL ELECTRIC "CONTAINERIZES" scrap and waste as they accumulate...

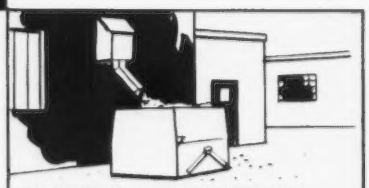
Rome, Ga. Plant "Containerizes" Scrap and Waste at Accumulation Points...One Man, One Dempster-Dumpster Serve 36 Containers

Dempster-Dumpster Disposal System Serves Today's Industrial Leaders....

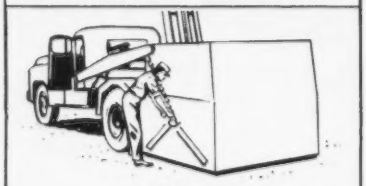
Industrial waste disposal has passed the day of manual shoveling, rehandling, shaky bins, wheelbarrows or cumbersome carts. General Electric and other leaders "*Containerize*" waste when and where it originates by using clean, big capacity, Dempster-Dumpster Containers. Tremendous savings in disposal costs are made with the one-man, one-truck Dempster-Dumpster which can service over a hundred accumulation points, picking up, hauling and emptying containers on a planned shuttle schedule.

Savings are so great that thousands of users, large and small have amortized their equipment investments in 18 months or less. If you are now using costly conventional methods of handling rubbish, waste and scrap in your plant, it will pay you to send for the free booklet below.

FREE: Write Today for Your Copy of
"How to Reduce Waste Disposal Costs."
DEMPSTER BROTHERS, Knoxville 17, Tenn., Dept. IA-12



WASTE IS CONTAINERIZED . . .



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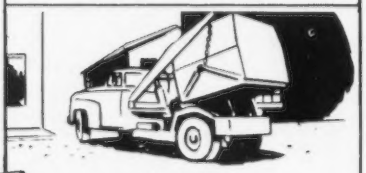

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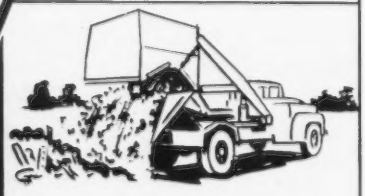

. . . AND DUMPED . . .

To: Dempster Brothers, Dept IA-12
Knoxville, Tennessee

Please Send Without Obligation Your Booklet, "How to Reduce Waste Disposal Costs."

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COMPANY .....

ADDRESS .....

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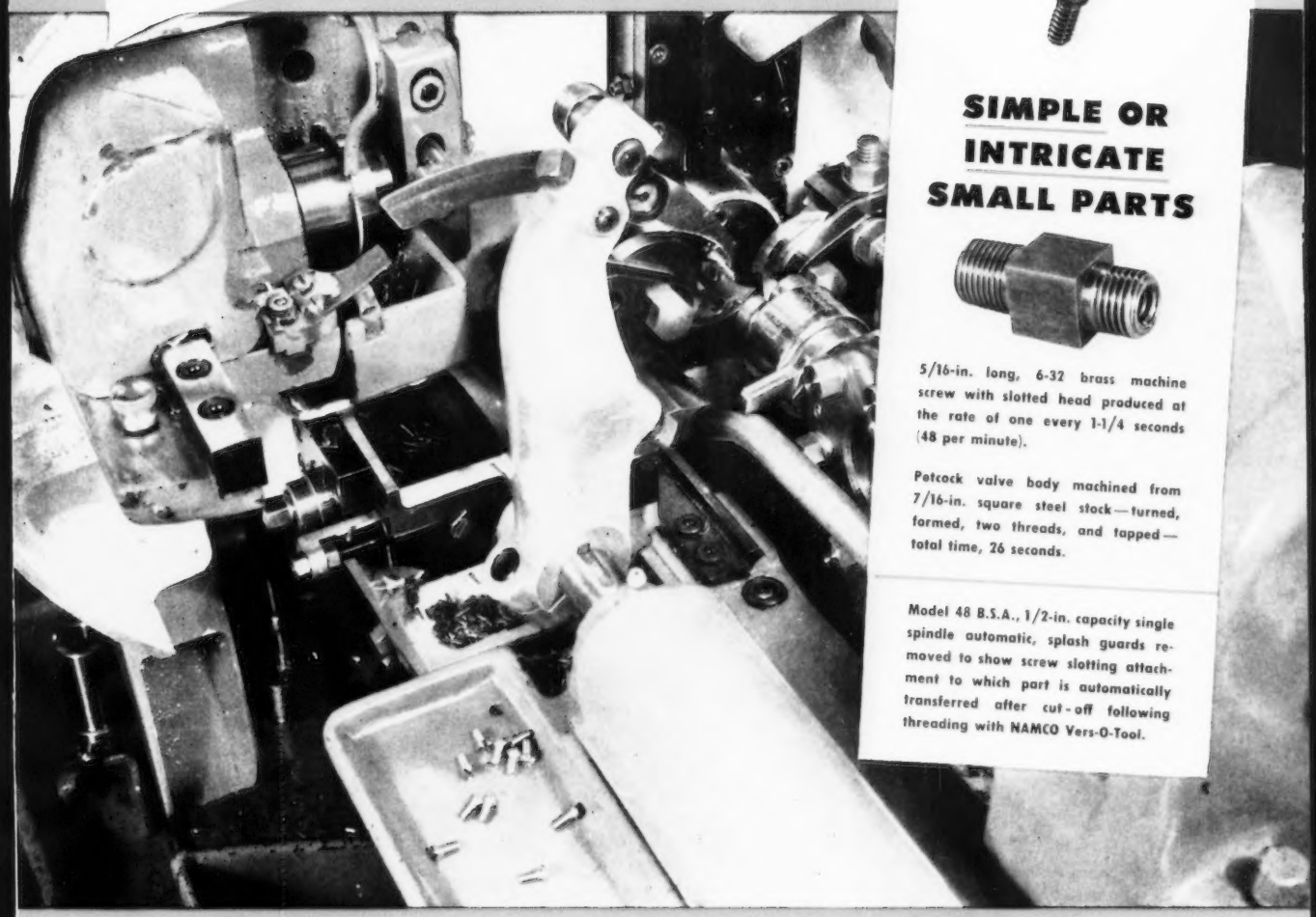
THE DEMPSTER DUMPSTER® SYSTEM

DISTRIBUTED AND SERVICED IN U. S. A. BY **NATIONAL ACME**

BSA Single Spindle Automatic SPEEDS PRODUCTION of



SIMPLE OR INTRICATE SMALL PARTS

5/16-in. long, 6-32 brass machine screw with slotted head produced at the rate of one every 1-1/4 seconds (48 per minute).

Petcock valve body machined from 7/16-in. square steel stock—turned, formed, two threads, and tapped—total time, 26 seconds.

Model 48 B.S.A., 1/2-in. capacity single spindle automatic, splash guards removed to show screw slotting attachment to which part is automatically transferred after cut-off following threading with NAMCO Vers-O-Tool.

B.S.A. single spindle automatics are designed for a wide latitude of machining operations with standard attachments. Thus maximum operating flexibility is maintained at all times to insure trouble-free continuous high volume output. Productive capacity includes those parts that require the most intricate automatic machining.

Tools, toolholders, cam blanks and similar equipment for all B.S.A. models are interchangeable with standard American tooling. Special tools and attachments further increase the range of application of these machines.

Built in 5 sizes—rated capacities, 1/2-in. to 2-in.; For general specifications, write for Bulletin B.S.A.-54.

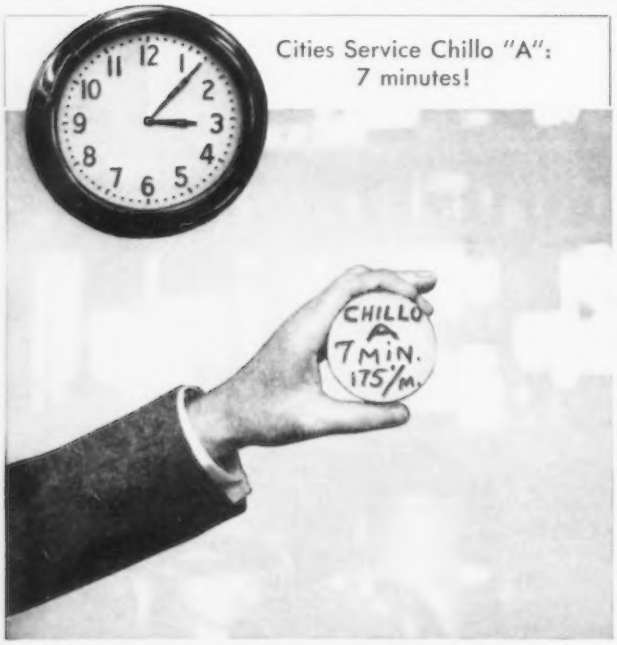
National Acme

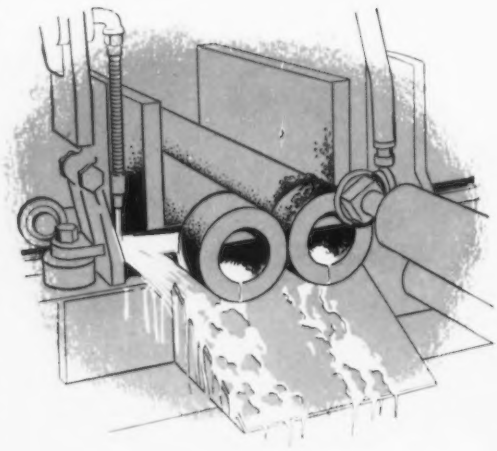
THE NATIONAL ACME COMPANY, 175 EAST 131ST STREET, CLEVELAND 8, OHIO

SALES OFFICES: • Newark 2, New Jersey • Chicago 6, Illinois • Detroit 27, Michigan

Cutting Oil takes the time test

at S. G. Frantz Co., Inc., Trenton, N. J.





S. G. Frantz Company decided to keep a truly open mind.

They'd been using Cities Service Chillo Cutting Oil and other Cities Service products for some time with great satisfaction. Still, there was no harm testing Chillo Cutting Oil against another brand just to make sure they were getting maximum results.

But even the people at S. G. Frantz never expected what followed. Using the competitive oil, and a piece of 4130 aircraft rod, $2\frac{7}{8}$" in diameter, they made a single cut at saw speed of 175 feet per minute. Time: 20 minutes.

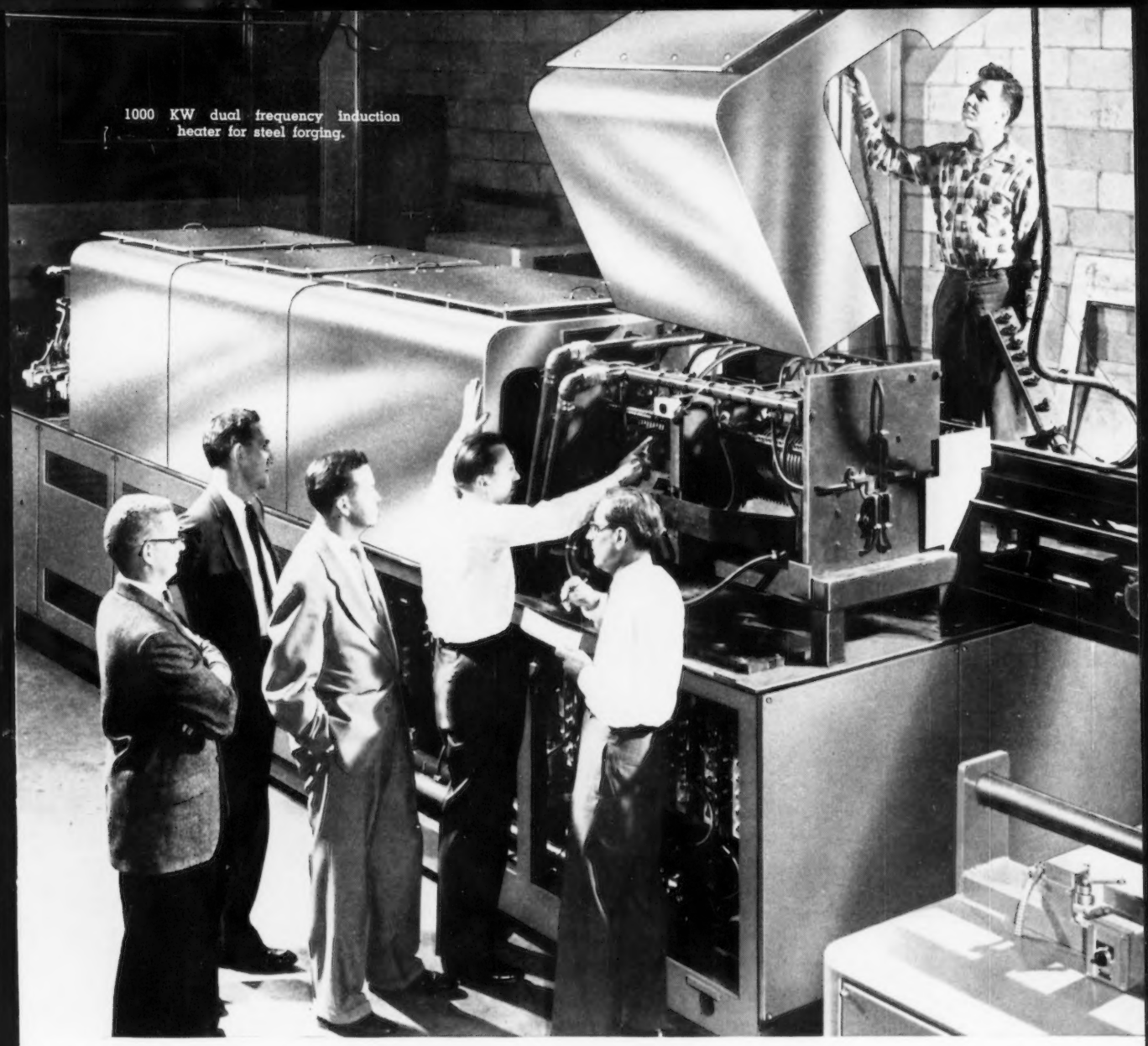
Next, the same test again – but this time with Cities Service Chillo "A" Cutting Oil. Time: 7 minutes! Nearly three times faster!

Using the same material on another job, the Frantz Company found difficulty making clean threads to aircraft standards on a Number 5 Turret Lathe—that is, until Cities Service Chillo 10Z was tried. Right there the problem ended.

"The problem ended." You'll hear it again and again from those who use Cities Service Cutting Oils and lubricants. And perhaps these oils can end a problem for you, too. Talk with a Cities Service Representative. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS



1000 KW dual frequency induction heater for steel forging.

James McLaughlin, Sales Manager, Low Frequency; Pete Hassell, Sales Manager, High Frequency; John Logan, President; Bruce McArthur, Vice President; Ted Kennedy, Chief Engineer

the Brass does much more than "TAKE A LOOK"

The Magnethermic brass has a personal interest in this heater.

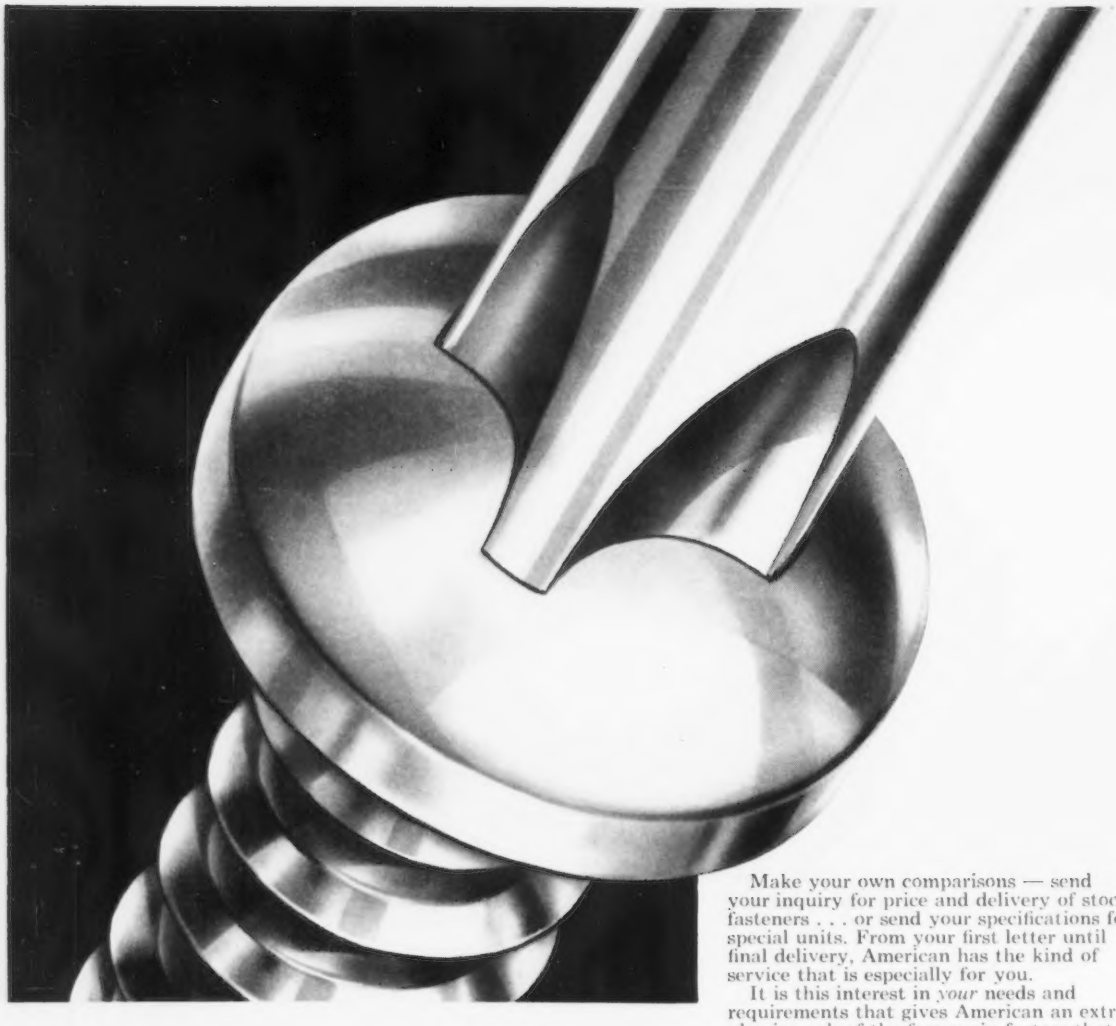
They have combined their talents on the original design, the application engineering, and the fabrication. Little wonder that they take this close look in the final stages of production.

This procedure is standard—not the exception. All Magnethermic Heaters, large or small, receive day-to-day supervision of the President, Vice President, Chief Engineer and other well-known authorities on induction heating.

Specialized attention to each order for induction heating equipment . . . high, low, or dual frequency can be applied only in a specialized company like Magnethermic where induction heating is the only business.

Induction Heating Equipment 60 to 450,000 cycles

MAGNETHERMIC®
CORPORATION
3990 SIMON ROAD • YOUNGSTOWN 7, OHIO



At your Service...

AMERICAN is the name!

Make your own comparisons — send your inquiry for price and delivery of stock fasteners . . . or send your specifications for special units. From your first letter until final delivery, American has the kind of service that is especially for you.

It is this interest in *your* needs and requirements that gives American an extra plus in each of the four main factors that govern your true fastener costs!

1. Price 2. Service 3. Quality 4. Research

American Gives You More of All Four

More in quality . . . with regular dimensional and physical inspections plus 30-minute exactness checks.

More in research . . . with important, new cost savings for you in your assembly and tooling, by the company that developed the original Phillips fastener.

More in service . . . with "in-stock" items in key locations in a full range of sizes and styles.

You may find *local* price differences occasionally, but nowhere will you get more of all four than at American.

When you send your inquiry, be sure to ask for American's stock list.

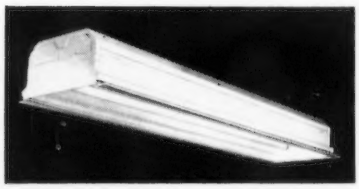
SCREWSTICK, another American development, enables power driving to replace individual handling of hard-to-manage small screws with a cost saving of 4 to 1.

AMERICAN SCREW COMPANY
WILLIMANTIC, CONN.
CHICAGO, ILL. • DETROIT, MICH.

Wood Screws • Machine Screws • Nuts • Tapping Screws • Thread Cutting Screws and Semis • Specials

American!

MANUFACTURER SHEDS NEW LIGHT ON WEIRZIN® RUST PREVENTION



In the market for a rust-resistant, eye-appealing and economically enduring zinc-coated steel? Then tune in on what the Edwin F. Guth Co., St. Louis, Mo., a leading manufacturer of lighting fixtures, has to say about Weirzin. For example:

RUST PREVENTION: "Weirzin electrolytic zinc-coated steel sheets *assure* our customers of a rustless product regardless of what section of the U.S.A. or hemisphere our Guth fixtures are sold. Whether it's damp, dry, moist or cold, Weirzin sheets once coated with paint really provide a finish that lasts."

PAINT SAVINGS: "There's a decided savings in the amount of paint we use; our finishes seem to grab hold of Weirzin sheets and stay there. Hence, with more positive paint adherence, we use considerably less paint. And, we find our present paint equipment can carry the load without the need for additional equipment."

Chemically treated Weirzin takes a beautiful paint, lacquer, enamel or lithographic ink finish. Holds it better than any other form of steel. Eliminates underfilm corrosion. Weirzin's electrolytic-process zinc coating has the ductility and toughness to withstand the severest fabrication operations. No flaking, peeling; no need for coating or re-coating after fabricating. For specific information on Weirzin in *your* applications, write Weirton Steel Company, Dept. A-15, Weirton, W. Va., for our free illustrated booklet—"Weirzin."

WEIRTON STEEL COMPANY

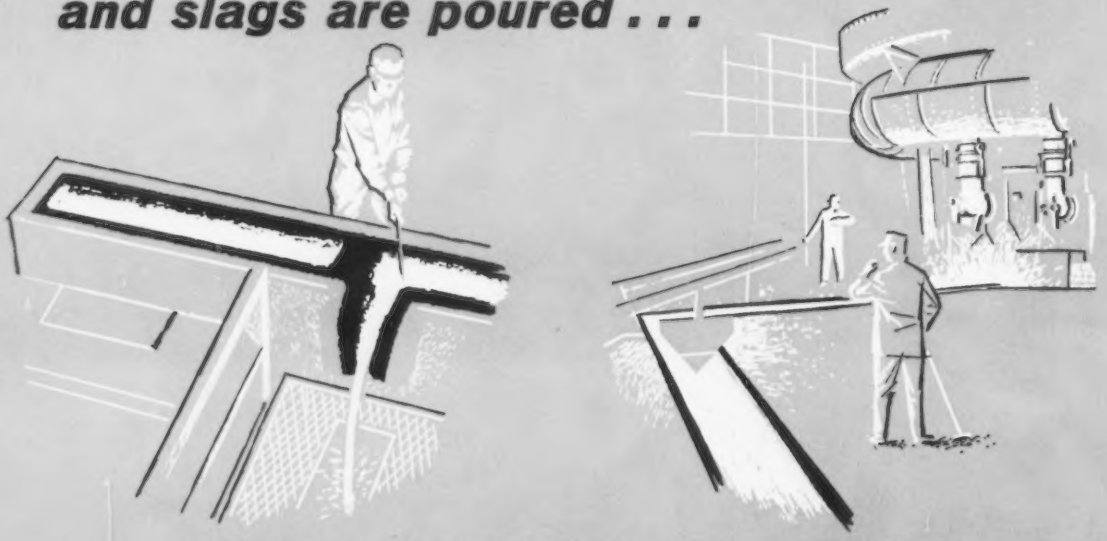
WEIRTON STEEL COMPANY

WEIRTON, WEST VIRGINIA

a division of

NATIONAL STEEL CORPORATION

Used where metals and slags are poured . . .



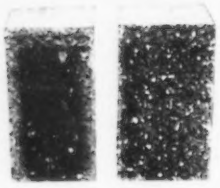
HARBISON-WALKER
BLACK PATCH
Plastic Graphite Refractory

- *reduces costs*
- *improves service*
- *assures cleaner metal*

Monolithic linings formed with H-W BLACK PATCH withstand severe corrosive and erosive action of various metals and slags, resist wetting and penetration and remain cleaner because there is less slag adherence.

When heated, H-W BLACK PATCH develops a strong ceramic set and a close texture which, together with the oxidation inhibitors, greatly retard burning of the carbon. In addition, the graphite component enhances the high resistance to thermal shock and increases the refractoriness of H-W BLACK PATCH.

NEW ZIP-OPEN CARTON aids in efficient handling of the plastic slabs. H-W BLACK PATCH is available in the form of plastic slabs 12" x 9" x 1"; in a compact mass in drums; or as a dry mixture in sacks, for mixing with water when used.



5-HOUR HIGH TEMPERATURE TEST SHOWS BLACK PATCH SUPERIORITY

Result of 5-hour test at 2730°F. Note difference in degree of oxidation. Test piece at left—ordinary graphite plastic; at right—H-W BLACK PATCH.

Some of the many important applications in which H-W Black Patch serves to advantage:

- HOLDING LADLES
- POURING LADLES
- BLAST FURNACE RUNNERS
- CUPOLA RUNNERS AND SPOUTS
- HAND LADLES
- CUPOLA TUYERE FACINGS
- MALLEABLE FURNACE RUNNERS AND SPOUTS
- CUPOLA IRON AND SLAG TAPPING HOLES

Another Quality Product of the World's Most Complete Refractories Service

HARBISON-WALKER REFRACTORIES COMPANY

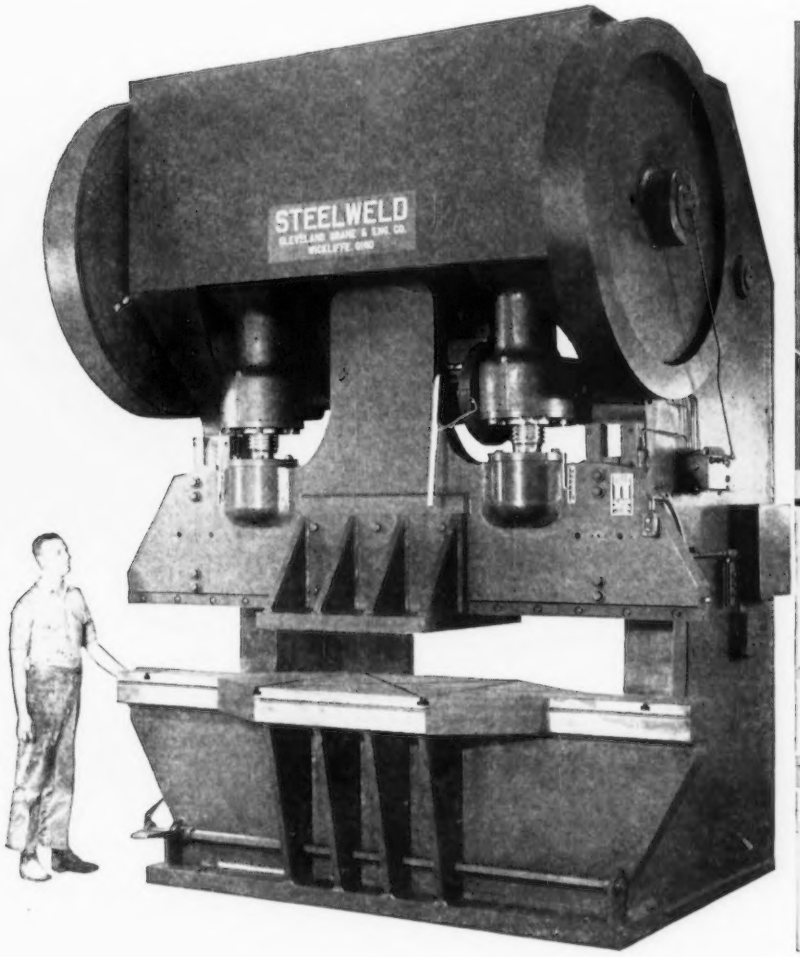
AND SUBSIDIARIES

General Offices: Pittsburgh 22, Pennsylvania

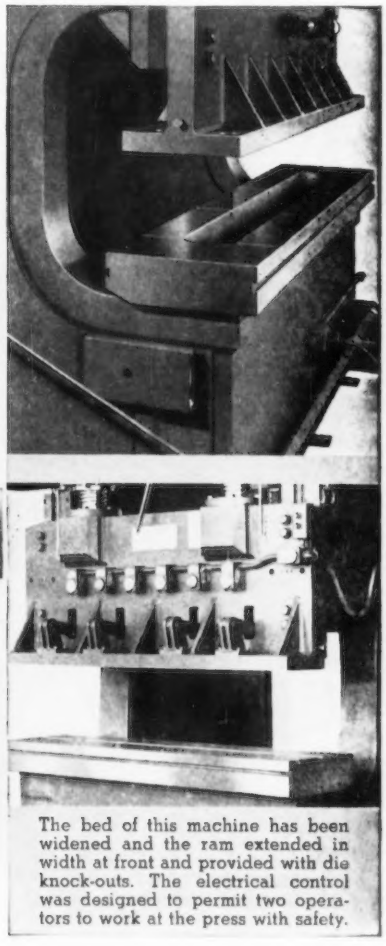
STEELWELD BRAKE DESIGN

Easily Adaptable For Special Requirements

Widening the bed of this 400 ton brake made it possible to serve a special purpose. The corresponding area of the ram was provided with a detachable ram bolster. With the bolster removed, normal brake operations can be carried on.



This Steelweld Brake was built with a double-plate bed having wide top and slot for punching purposes. This makes a low-cost press that is excellent within certain limits.



The bed of this machine has been widened and the ram extended in width at front and provided with die knock-outs. The electrical control was designed to permit two operators to work at the press with safety.

WHILE a standard press brake can handle a wide variety of metal-forming operations, often certain construction changes can be made that will permit doing work that normally would require a large costly forming press. Design changes can also be made that will speed production, improve safety or bring about other desirable advantages for specific types of work.

STEELWELD
PRESS BRAKES

Steelweld engineers have had a great deal of experience in tailoring press brakes to suit special jobs. Brakes have been built with many types of beds, with various shut heights, different speeds, unusual control arrangements, special gauges and safety devices, unique feeding equipment, etc. Because Steelweld's design is such as to make changes comparatively easy, the cost is reasonable.

For that next metal-forming job, whether it be a standard press brake operation or an out-of-the-ordinary one, it will pay you to investigate the possibilities of versatile Steelweld Press Brakes.

Write for free copy of Catalog No. 2010

STEELWELD DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 4865 E. 281 ST. • WICKLIFFE, OHIO

THE CASE OF THE

HALF FINGERPRINT...

...and what it means to you!

These three plates were synthetically fingerprinted. The one at the left was then dipped in Solvent. The center plate was half submerged in Houghton's Fingerprint Neutralizer (Rust Veto) and the plate at the right was completely immersed in the same neutralizer. After one week's exposure, rust had formed as shown on the surfaces *not* protected by Rust Veto, thus proving its ability to neutralize such prints.

That half print shows dramatically how RUST VETO protects highly finished metal from corrosion. Read the complete story at the left.

This is only one example of Houghton's rust prevention service. Since 1869, we have specialized in developing products to meet every type of rust problem.

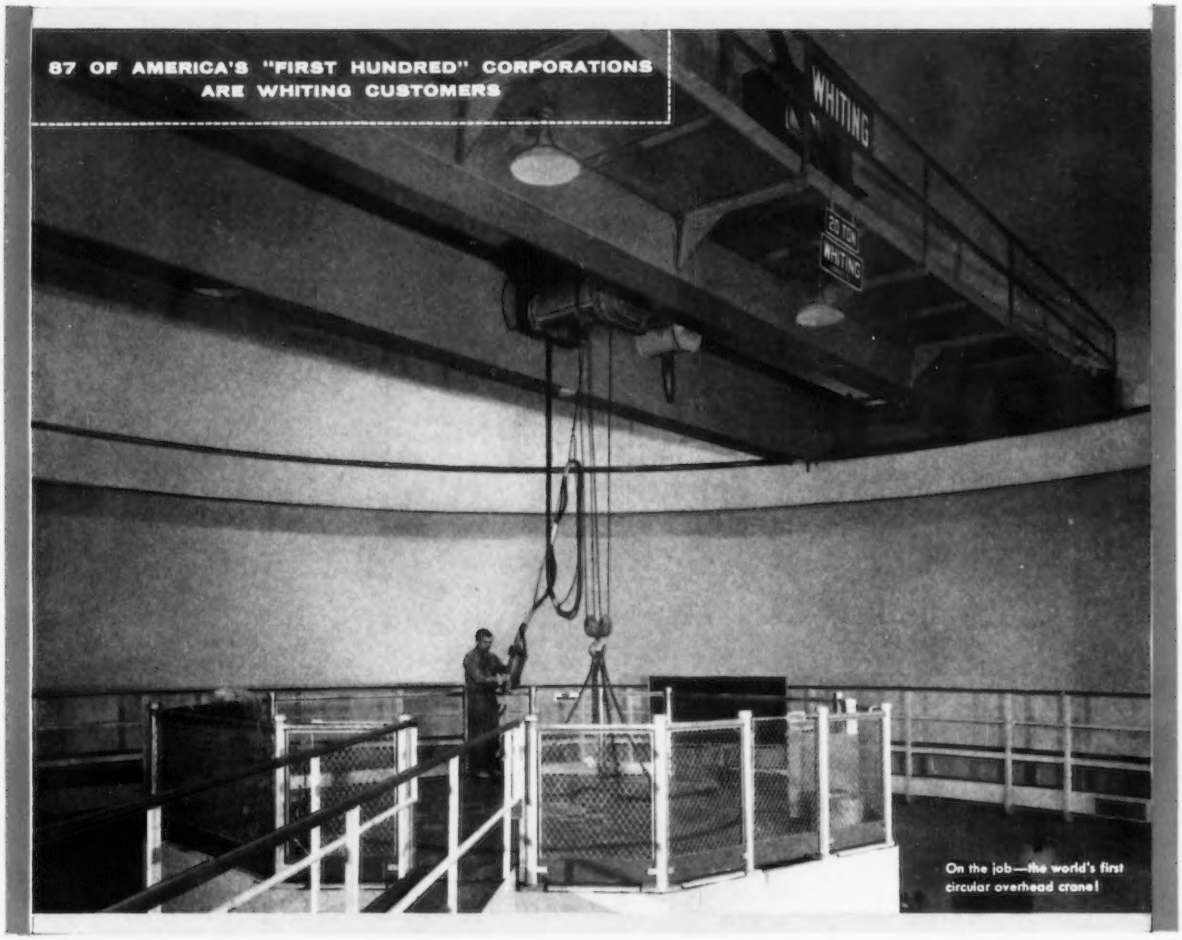
If you have a corrosion problem, put it up to the Houghton Man — or write direct to E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

RUST VETO ...a product of

E. F. HOUGHTON & CO.

PHILADELPHIA · CHICAGO · DETROIT · SAN FRANCISCO

Ready to give you on-the-job service . . .



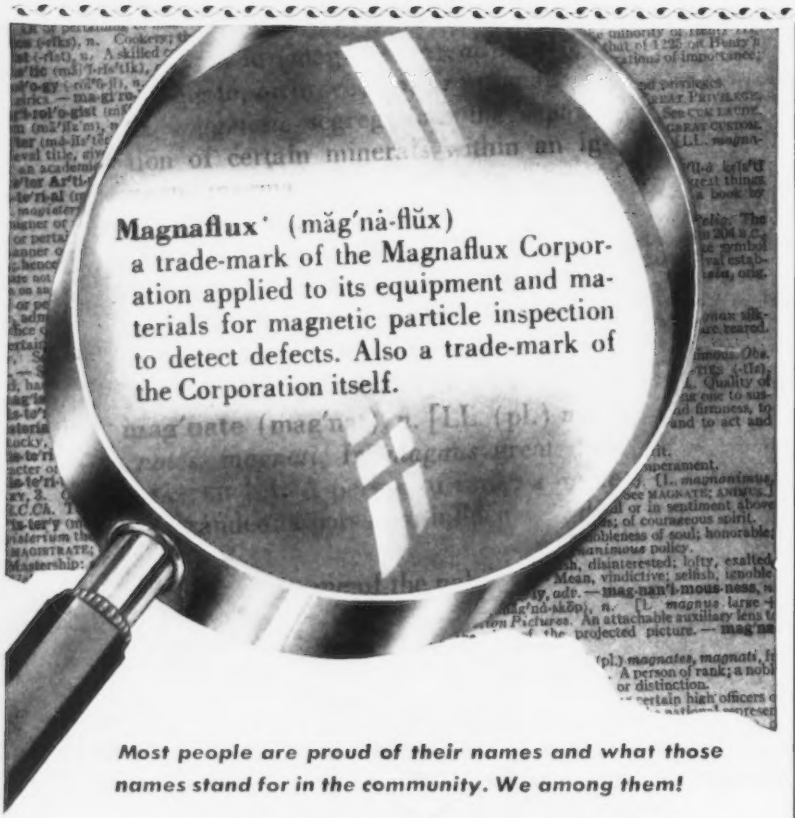
At Argonne National Laboratory... the cranes that "couldn't be built!"

The world's first circular overhead cranes are at work, today. They're giving science a "lift" in two separate atomic projects at the Argonne National Laboratory, Lemont, Illinois. Operating on circular runways, each crane pivots about its axis, can reach everything within the building it serves. New in concept, these cranes that "couldn't be built" exemplify Whiting engineering ingenuity . . . prove again Whiting's ability to solve the most challenging overhead handling problems. Whether your needs call for the unique or the conventional, Whiting engineering custom-designs and builds the crane that will serve you best! *Whiting Corporation, 15601 Lathrop Avenue, Harvey, Illinois.*

For complete information, request our new full-color Bulletin 90, "Whiting Circular Overhead Cranes for Atomic Energy." Also available upon request, Bulletin 80 talks about Whiting cranes in general, shows why they are Industry's standard.

WHITING CRANES

MANUFACTURERS OF CRANES; TRAMBEAM HANDLING SYSTEMS, TRACKMOBILES; FOUNDRY, RAILROAD AND CHEMICAL PROCESSING EQUIPMENT


Magnaflux* (măg'nă-flŭx)
a trade-mark of the Magnaflux Corporation applied to its equipment and materials for magnetic particle inspection to detect defects. Also a trade-mark of the Corporation itself.

Most people are proud of their names and what those names stand for in the community. We among them!

MAGNAFLUX*

is a Trade Mark

Magnaflux Corporation pioneered nondestructive testing with inspection methods to detect defects that give industry low cost means to insure dependable quality. Result: better products at lower cost turned out with less waste, for more people.

Magnaglo* and Zyglo* and certain other names are also trade-marks registered by us. They have become recognized symbols, for inspection equipment developed and sold by Magnaflux Corporation—used by more industries, for more inspection operations than all other methods combined!

But "Magnaflux"* stands for even more than this. For users of Magnaflux*, it stands for unlimited co-operation, counsel and research in nondestructive testing methods. It stands for the personal help of trained nondestructive testing engineers—for instruction schools and providing new information. All this is part of our service.

If you'd like to know more about Magnaflux Corporation—its people and its methods—write for the booklet "Seeing Isn't Always Believing." Hundreds of businessmen and executives have found it interesting reading.

MAGNAFLUX

is also the name of

"THE HOUSE OF ANSWERS"

—supplying industry's broadest range of nondestructive testing systems and equipment.

You may have one kind of testing need — your neighbor has another — the plant across town still another.

But you would probably agree to one common need for practical quality standards that will help you to "make it better, but make it cost less."

We can help you, through *low cost* nondestructive testing. This is *our* business . . . our only business.

Magnaflux (the Corporation) makes and sells many types of nondestructive systems, using many methods . . . more in fact than anyone else—probably because we are asked to solve more testing problems than anyone else!

Prices range from $36 (for a portable Spotcheck Spray-On Dye Penetrant Inspection Kit) to thousands of dollars for an automatic, conveyorized Magnaglo or Zyglo unit that will handle thousands of pieces per hour — usually at a tiny fraction of a cent cost per piece inspected.

Magnaflux Testing Systems include:

Magnaflux-Magnaglo — Magnetic Particle Tests — Zyglo — Fluorescent Penetrant Testing — Sonizon — Ultrasonic Testing — Magnatest — Electronic Eddy Current Instruments — Stresscoat — Stress Analysis of entire parts

and many others for practically any material or nondestructive test need.

All these Testing Systems have one aim: To help you increase net yield by reducing cost and waste.

Your Magnaflux Field Engineer will be glad to work with you to find the Magnaflux System, method and equipment with the highest profit potential for you. Write and we'll arrange a meeting. This consulting service costs you nothing—and it may save you a great deal, indeed.

THE HALLMARK OF QUALITY IN NONDESTRUCTIVE TEST SYSTEMS

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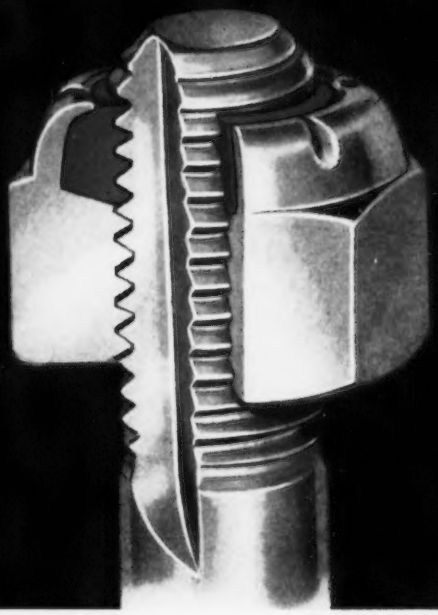
The nylon collared Elastic Stop® nut never damages bolt threads!



The nylon locking insert * will not seize threads, gall or remove plating

The red nylon locking collar is an integral part of an Elastic Stop nut. Undersize in diameter in relation to standard bolt tolerances, this insert grips the entering bolt threads with strong, smooth nylon fingers that dampen impact loads and resist turning under the most severe conditions of vibration or shock. The perfect fit between bolt threads and the locking collar also serves to seal off internal bolt and nut threads and to protect them against corrosion. Furthermore the nylon insert is impervious to gasolines, oils, salt atmospheres, cleaning compounds and common acids. The remarkable wear resistance of nylon plus its elastic recovery makes Elastic Stop nuts reusable through more than a hundred on and off cycles.

Because an Elastic Stop nut is a one-piece unit it is less expensive to install than castellated nuts and cotter pins, or double nuts. Equally important, it is a *stop* nut that *locks at any position on the bolt* without requiring secondary "safety" devices; it is simple to adjust precisely—it is easily wrenched off or readjusted. Elastic Stop nuts have been used by American industry since 1930 to solve the toughest applications on railroad, automotive, earth moving and farm equipment, as well as on all types of electrical machinery.

Elastic Stop nuts are available in sizes ranging from a watchmaker's 0-80 through 3", and in many standard finishes and materials including carbon and stainless steels, brass, duronze and aluminum.

ELASTIC STOP NUT CORPORATION OF AMERICA

ESNA

also maker of the ROLLPIN

*The Red Locking Collar is a Registered Trademark of ESNA

Only ESNA manufactures a complete line of all types of self-locking nuts.

Elastic Stop Nut Corporation of America
Dept. N27-775, 2330 Vauxhall Road, Union, N. J.

Please send me the following free fastening information:

☐ ELASTIC STOP nut bulletin

☐ Here is a drawing of our product. What self-locking fastener would you suggest?

Name_____ Title_____

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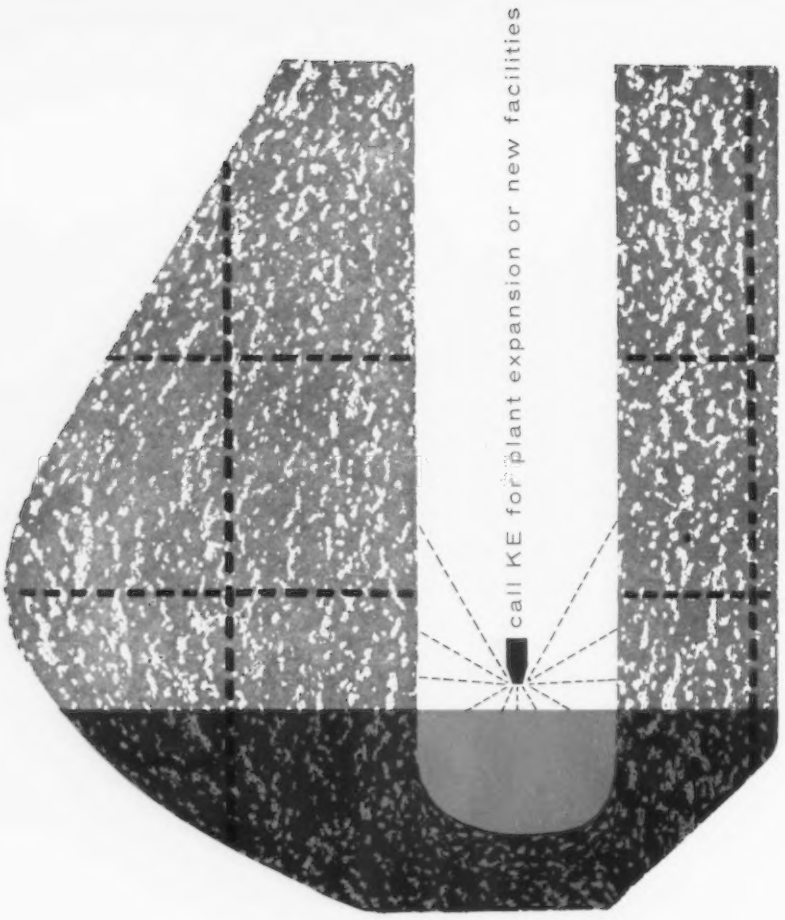
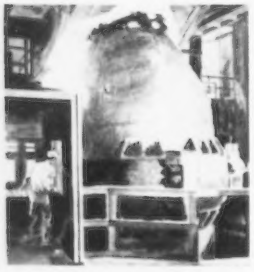


INGENUITY

has made KE the experienced leader in L-D Process Steel



L-D process plant similar to that now being installed by KE at a major eastern steel plant

Design and construction of over 2,000,000 tons of oxygen steel making capacity. Intimate familiarity with oxygen steel technology in all parts of the world. A pioneer's experience in applying tested techniques of steel making. U.S. licensor for the proven L-D process—also P.T. Oxygen Guns for present and planned open hearths.

These are reasons why Kaiser Engineers is uniquely qualified to develop your oxygen steel program. Another reason is traditional KE ingenuity—engineering and construction ingenuity which means your steel facilities will be completed more quickly, at lower cost, and operate more efficiently.

Economic analysis, plant location, engineering, design, procurement, expediting, construction—KE does one or all. With your first thought of new steel producing facilities—call KE.

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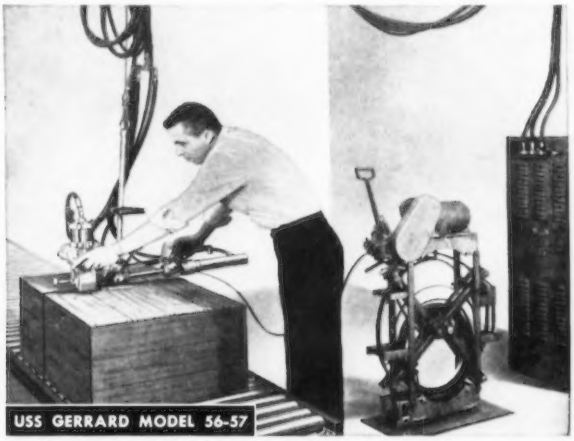
USS GERRARD STEEL STRAPPING EQUIPMENT MAKES PACKAGING EASY

"HANDLING TIME CUT—BREAKAGE REDUCED". . . says Climax Fire Brick Company as a result of USS Gerrard Steel Strapping. The workman shown above is using the USS Gerrard Model 40 with $\frac{3}{4}$" x .035" flat strapping to tie 42 50-pound tuyeres into a pallet. Since the Gerrard-palletized tuyeres can be safely stacked much higher than before, storage space has also been increased 33⅓.

FROM STEEL SHEETS TO NUTS. Because USS Gerrard Strapping conforms to corners easily, ties conventional-shaped units, as well as odd-shaped bundles and any size crates, operation is fast and efficient. For example, the USS Gerrard Model K with 12-gauge round steel strapping shown above is doing a job on bricks in $\frac{1}{2}$ the time it took this customer before and with 1/3 the manpower.

24 CYCLES PER MINUTE—AUTOMATICALLY. Where automation is important to your packaging and bundling problems, the USS Gerrard Model 12 Automatic Machine will handle even the toughest jobs. Using USS Gerrard Round Steel Strapping, 14-gauge through 18-gauge, this machine makes up to 24 cycles per minute on packages from 8" x 2" to 26" x 20". Tension can be pre-set and maintained on all packages regardless of size or weight. This machine is easy to operate and its compact, rugged construction with a one-shot built-in lubrication system means low maintenance.



CONTROLLED TENSION — FAST OPERATION. You can get faster, more efficient strapping and packaging with the new USS Gerrard Model 56-57. This hydraulic-powered sealer-stretcher combination provides automatic, predetermined tension control insuring uniform tension on every package. Sealer head is easily positioned and push-button operated . . . can be converted from $\frac{3}{4}$" to $1\frac{1}{4}$" flat steel strapping in *less than 60 seconds*. For complete information and full details about the new USS Gerrard Model 56-57, just fill out the convenient coupon below.

GERRARD STEEL STRAPPING

ROUND AND FLAT

Department of

U. S. STEEL SUPPLY DIVISION

United States Steel, General Offices: Chicago, Illinois

UNITED STATES STEEL

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- ☐ Folder on Hydraulic Sealer-Stretcher
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Painting is easier with a bucket which has a dependable, easy-to-use handle made from low carbon, hard drawn CF&I-Wickwire Pail Bail Wire.

Chances are you don't need pail bail wire to make paint bucket handles. But *you may need one or more of the nearly 100 different categories of specialty wire for which CF&I-Wickwire is famous.* Let us show you how we can meet your most rigid chemical and physical specifications on high and low carbon wire in all sizes, shapes, tempers, finishes and grades.

the painter's helper

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Bookbinder Wire
Broom Wire
Clip Wire
Dent Spacer Wire
Drapery Pin Wire
Florist Wire
Fuse Wire
Glass Netting Wire
Hairpin Wire
Hook and Eye Wire
Mattress Wire
Picture Cord Wire
Picker Tooth Wire
Pin Ticket Wire
Pin Wire
Ring Traveller Wire
Spiral Binding Wire
Stapling Wire
Stapling Wire for Preformed Staples
Stone Wire
Weaving Wire
Weaving Wire for Fly Screen Cloth
Wissco Iron Wire

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Bobbin Ring Wire
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Curtain Spring Wire
Flexible Shaft Wire
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Zig Zag Wire
No-Sag Wire
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- ☐ ENAMEL STRIPPERS—A wide variety of strippers are maintained "in stock". In addition, Enthone will be glad to study your requirements and develop the precise stripper you need to meet your requirements.
- ☐ "ALUMON"—A product of highest-purity chemicals for preparing aluminum for plating. Used successfully for over 13 years by hundreds of manufacturers, Alumon is economical and easy to use.
- ☐ EBONOL® METAL BLACKENERS—Products for blackening copper, brass and other copper alloys; iron and steel; zinc plate and zinc castings.
- ☐ RUST REMOVERS—A complete line of chemicals for the removal of rust and scale. Both alkaline and acid compounds are available.
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- ☐ RUSTPROOFING COMPOUNDS—Rustproofing oils, waxes and chemical compounds for protecting steel against rust in salt spray, high humidity and outdoors.
- ☐ ZINC & CADMIUM CONVERSION COATINGS—Enthox® salts produce iridescent, gold colored chromate coatings with high salt-spray resistance. Very simple and economical to use.

Remember — your metal finishing problem is our business! Since Enthone has been studying these problems, and developing their solutions, for 20 years, chances are we have the answer to your problem in stock. On the other hand, if yours is an unusual requirement, we will be glad to study your needs and develop the precise chemical for the purpose. Just send us a letter, outlining the problem or process—and enclose a sample of the metal concerned, if possible.

Write to Dept. IA-12

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Now! A Complete Line of Self-Locking Microsize UNBRAKO Socket Cap and Set Screws

Nos. 0, 1, 2 and 3 in alloy steel and stainless steel are available with the Nylok* feature

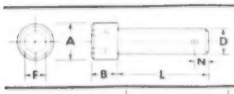
You effect major economies in time and money when you design and assemble small devices with self-locking microsize UNBRAKO socket screws. These close tolerance screws won't work loose. They simplify standardization of small devices where maximum reduction of weight is required without sacrifice of strength. They eliminate the necessity of designing costly special screws to fasten tiny parts in compact assemblies and they prevent the waste of production time while waiting for delivery of special screws.

In addition to having the overall advantages of microsize UNBRAKO socket screws, these screws can be used in holes tapped in soft or die cast materials without stripping threads and ruining expensive work. Also the set screws can be used with hardened shafts, since they lock against the threads of the tapped hole.

All UNBRAKO socket screws can be supplied with the self-locking Nylok feature. The UNBRAKO with Nylok is a single self-locking unit. No auxiliary locking devices are needed. Seated or not, the screw locks positively wherever wrenching stops, won't work loose—because the tough resilient nylon pellet forces mating threads together.

Ask your authorized industrial distributor for details today. He carries complete stocks of self-locking UNBRAKO socket screws (caps and sets from #0 through 1 in., button heads #4 through ⅜ in., flat heads from #4 through ¼ in.). Or write us for literature and samples. Unbrako Socket Screw Division, STANDARD PRESSED STEEL Co., Jenkintown 17, Pa.

*T.M. Reg. U.S. Pat. Off., The Nylok Corporation



HEAT-TREATED ALLOY STEEL
Self-Locking Microsize UNBRAKO Socket Cap Screws
Class 3A Threads

Screw Size		Threads per in. NC	Threads per in. NF	L Over-all Length	N Pellet Location NC	N Pellet Location NF	Torque: Max. prev. on	Torque: 1st off stat. min.	Torque: 5th off stat. min.
#0	A .104	—	80	1/8	—	.047	5.5	14.0*	7.0*
	B .060	—	80	3/16	—	.047	5.5	14.0*	7.0*
	D .060	—	80	1/4	—	.047	5.5	14.0*	7.0*
	F .050	—	80	3/8	—	.047	5.5	14.0*	7.0*
#1	A .118	—	72	1/8	—	.047	11.0	28.0*	14.0*
	B .073	—	72	3/16	—	.047	11.0	28.0*	14.0*
	D .073	—	72	1/4	—	.047	11.0	28.0*	14.0*
	F .050	—	72	3/8	—	.047	11.0	28.0*	14.0*
#2	A .140	56	—	3/16	.063	—	24.0	3.0	1.5
	B .086	56	—	1/4	.063	—	24.0	3.0	1.5
	D .086	56	—	3/8	.063	—	24.0	3.0	1.5
	F 1/16	56	—	1/2	.063	—	24.0	3.0	1.5
#3	A .161	48	—	3/16	.063	—	40.0	6.5	3.0
	B .099	48	—	1/4	.063	—	40.0	6.5	3.0
	D .099	48	—	3/8	.063	—	40.0	6.5	3.0
	F 5/64	48	—	1/2	.063	—	40.0	6.5	3.0

*Measured in in.-gm. (those not marked with a star are measured in in.-oz.)

HEAT-TREATED ALLOY STEEL
Self-Locking Microsize UNBRAKO Socket Set Screws
Class 3A Threads

Screw Size		Threads per in. NC	Threads per in. NF	L Over-all Length	N Pellet Location NC	N Pellet Location NF	Torque: Max. prev. on	Torque: 1st off stat. min.	Torque: 5th off stat. min.
#0	D .060	—	80	3/32	—	.047	5.5	14.0*	7.0*
	F .028	—	80	1/8	—	.047	5.5	14.0*	7.0*
		—	80	5/32	—	.047	5.5	14.0*	7.0*
		—	80	3/16	—	.047	5.5	14.0*	7.0*
		—	80	1/4	—	.047	5.5	14.0*	7.0*
#1	D .073	—	72	1/8	—	.062	11.0	28.0*	14.0*
	F .035	—	72	5/32	—	.062	11.0	28.0*	14.0*
		—	72	3/16	—	.062	11.0	28.0*	14.0*
		—	72	1/4	—	.062	11.0	28.0*	14.0*
#2	D .086	56	—	1/8	.062	—	24.0	3.0	1.5
	F .035	56	—	5/32	.062	—	24.0	3.0	1.5
		56	—	3/16	.062	—	24.0	3.0	1.5
		56	—	1/4	.062	—	24.0	3.0	1.5
#3	D .099	48	—	5/32	.093	—	40.0	6.5	3.0
	F .050	48	—	3/16	.093	—	40.0	6.5	3.0
		48	—	1/4	.093	—	40.0	6.5	3.0

*Measured in in.-gm. (those not marked with a star are measured in in.-oz.)

Self-locking microsize UNBRAKO socket cap and set screws are available in sizes #0 through #3, in heat treated alloy steel (plated or unplated) and stainless steel, at your authorized industrial distributor. He also carries a complete stock of other self-locking UNBRAKO socket screws.

We also manufacture precision titanium fasteners. Write for free booklet.

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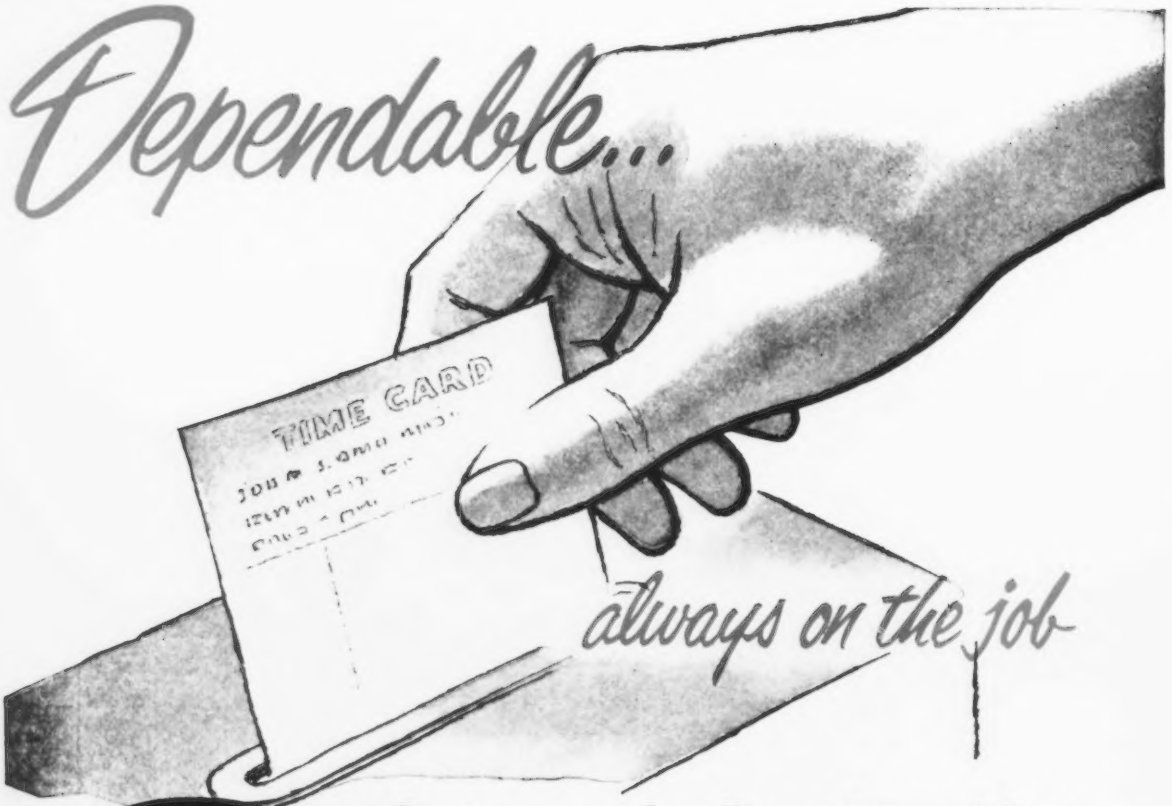
Dependable...



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PRODUCTION MACHINERY

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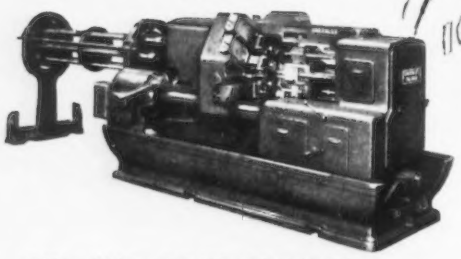
Automatic Bar Machines



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ARMCO 17-4 PH* Stainless Steel *now stocked at*

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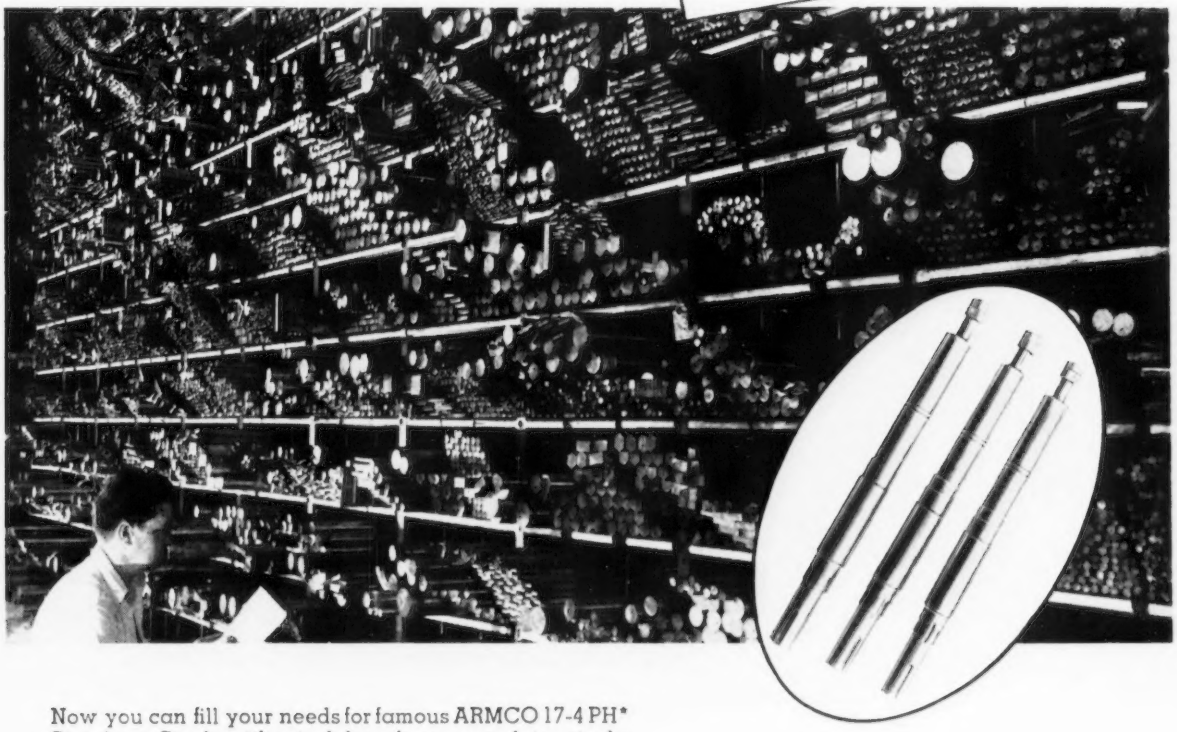

Now you can fill your needs for famous ARMCO 17-4 PH* Stainless Steel without delay from complete stocks at VIKING STEEL. ARMCO 17-4 PH* is the special stainless steel that combines higher yield strength with greater corrosion resistance and saves machining time as well. For example, the pump shafts illustrated, made from 17-4 PH* not only cost less to produce but provide much longer service than the material formerly used.

ARMCO 17-4 PH* is available in bars in a complete range of sizes, cut to your specifications from our large warehouse stocks. VIKING STEEL's metallurgical and engineering service are at your service to help you with your stainless problems or to supply further technical information.

For further information on the advantages of ARMCO 17-4 PH* call or write VIKING STEEL.

COMPLETE STAINLESS SERVICE

In addition VIKING STEEL COMPANY offers a complete service on all types of stainless steel bar, plate, sheet wire, strip and forgings. We stock over one million pounds in our Cleveland warehouse, and can also give excellent service on mill orders.

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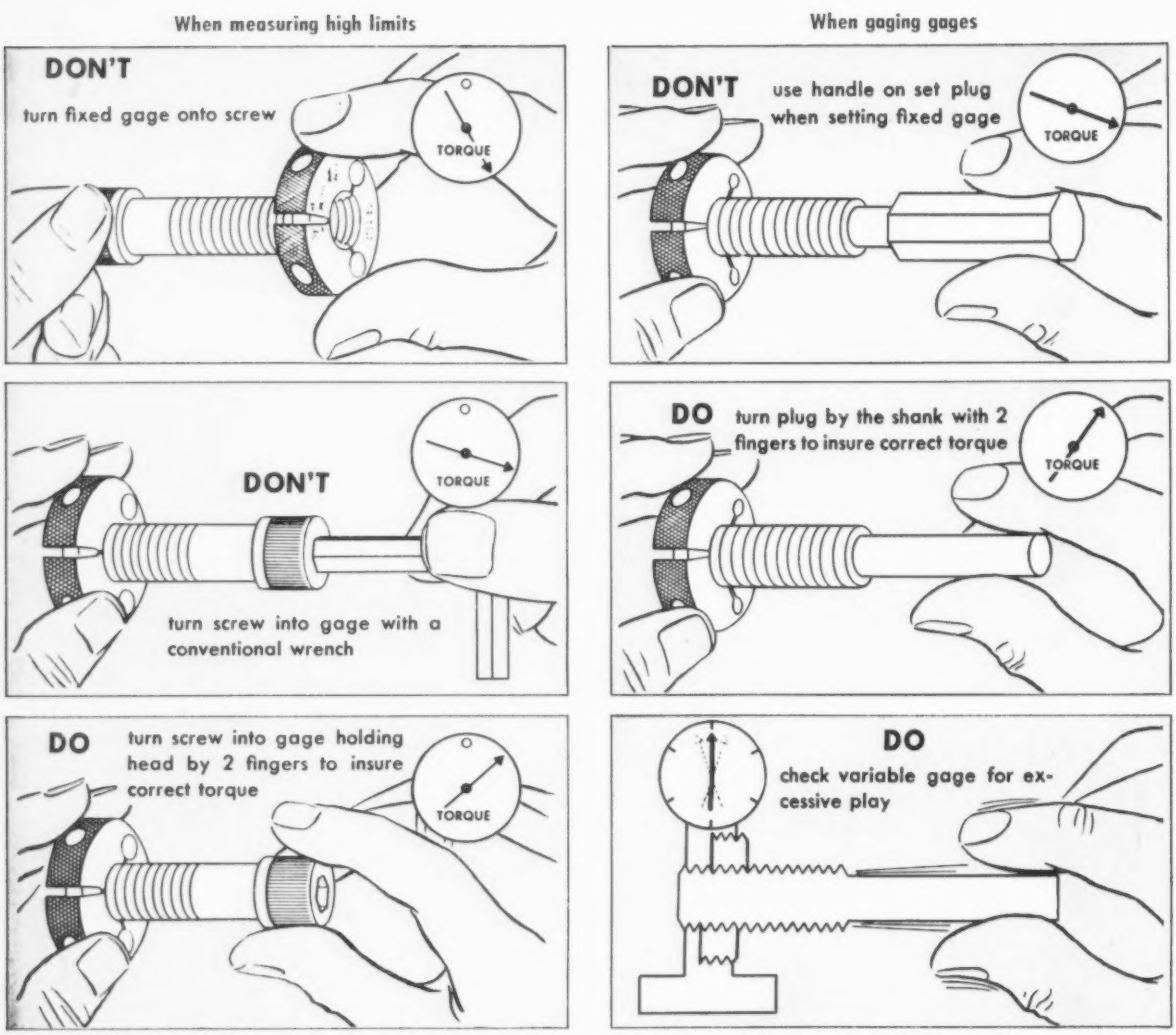


These illustrations from new SPS booklet show some of the do's and don'ts of gaging precision threads.

3A threads: what they are; how to gage them — new SPS booklet tells all

Threads made to Class 3A fit are the most precise in general use in industry. But you do not always get the 3A precision you specify. Because of many different gaging techniques that yield varying results, screws with threads well outside the Class 3A tolerance limits often pass inspection.

SPS has prepared a new booklet on this subject. It explains clearly what Class 3A threads are and the pros and cons involved in the widely varying gaging techniques in use today. It reviews the gaging of high and low limits of 3A threads, sampling techniques, and even the methods of gaging gages.

All standard UNBRAKO socket screw products fall within specified tolerance limits *no matter what method is used to gage them.* Leading industrial distributors carry complete stocks. Unbrako Socket Screw Division, STANDARD PRESSED STEEL Co., Jenkintown 17, Pa.

We also manufacture precision titanium fasteners. Write for free booklet.

Form 2239, "Class 3A Threads: what they are; how to gage them." 16 pages, with many illustrations. Write for free copy today.

STANDARD PRESSED STEEL CO.

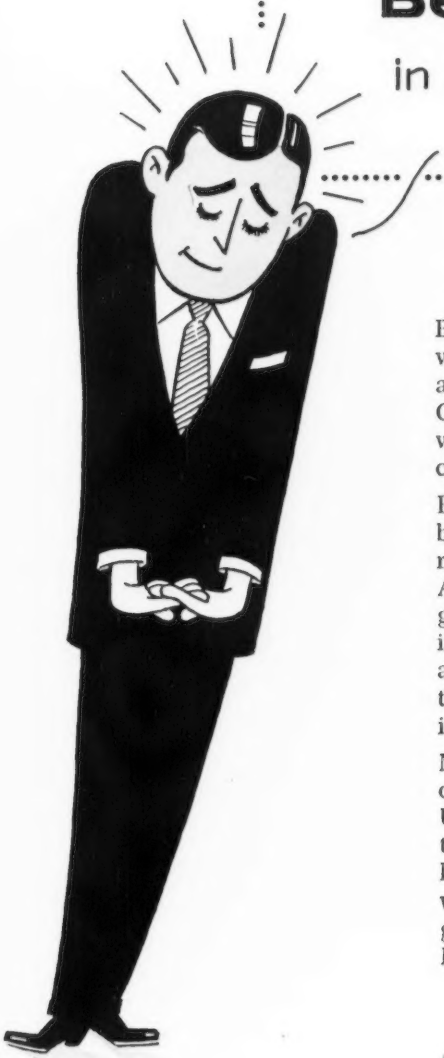
UNBRAKO **SOCKET SCREW DIVISION** SPS

JENKINTOWN PENNSYLVANIA

We hate to admit it but we had trouble with a

Bellows Air Motor

in Reading, Pennsylvania



Bellows Air Motors — the unique air cylinder with the built in valve — have established enviable records for trouble free performance. Operating cycles of 20,000,000 to 30,000,000 without maintenance of any kind are quite common. Fifty million cycles nothing unusual.

But trouble sometimes occurs — even in the best regulated families. A few weeks ago we received a phone call late at night. A Bellows Air Motor on an important production line had gone haywire. Could we ship a replacement immediately? We did better than that. We had a Bellows Field Engineer at his plant at 8:00 the next morning. At 9:00 the line was back in operation.

More than 125 Bellows Field Engineers (one or more in every major industrial area in the United States and Canada) are your assurance that if you ever do have trouble with any Bellows equipment it will be remedied quickly with minimum down time. (But between us girls, trouble with Bellows "Controlled-Air-Power" Devices is most unusual!)

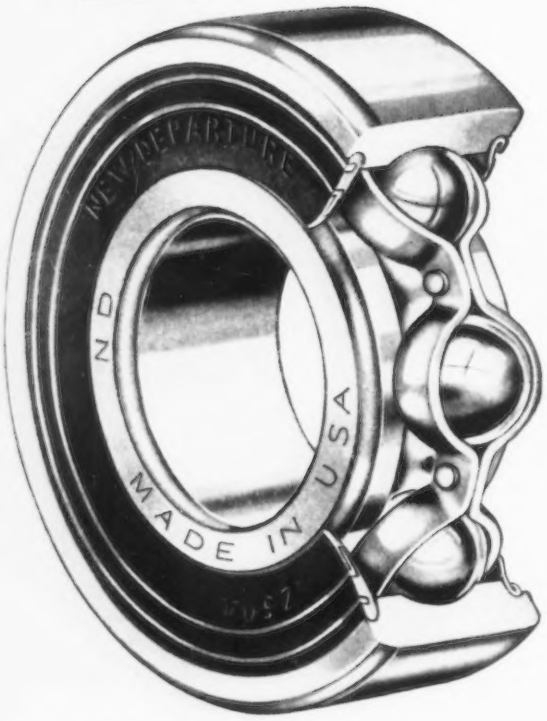
The Bellows Co.

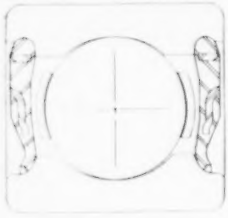
AKRON 9, OHIO

MANUFACTURERS OF CONTROLLED-AIR-POWER DEVICES FOR **FASTER**, SAFER, BETTER AND **LOWER-COST** PRODUCTION

830-B

ND FACTS





The diagram shows in section the New Departure Sentri-Seal. Lip contacting surfaces are form-ground simultaneously with the ball race, giving an extremely high degree of concentricity between sealing surfaces and the raceway.

The unique design of the Sentri-Seal gives optimum protection against dirt, and includes a number of other major advantages.

Sentri-Seals can be removed, easily replaced. As the seal is of synthetic rubber in which two metal rings are embedded, a constant-rate spring is created between the rings. Inherent flexibility prevents distortion of the bearing outer ring due to seal insertion, permitting the use of bearings to the higher accuracy specifications. The spring action maintains an efficient sealing contact with the bearing ring to bar dirt and retain lubricant. Sentri-Seals are relatively inert to oils and greases and operate satisfactorily through a temperature range of −40°F. to 225°F. Specifications available for still higher temperatures. In applications where relubrication is desired, it is easily accomplished by the injection method.

Write for full details on Sentri-Seal

ONE SENTRI-SEAL | SEAL AND SHIELD | SEAL AND SNAP RING | TWO SEALS AND SNAP RING | SEAL, SHIELD AND SNAP RING

Sentri-Seal is available for a range of sizes in single-row, standard-width bearings and also in two types of New Departure adapter bearings. Sizes, dimensions and capacities are listed in the latest New Departure catalog.

GM
FORWARD FROM FIFTY

NEW DEPARTURE
DIVISION OF GENERAL MOTORS, BRISTOL, CONN.
NOTHING ROLLS LIKE A BALL

Phosphate-Bath Blanket

A new chemical blanket for use on hot phosphate coating baths claims to save 70 pct of the heat now lost through escaping steam and fumes. The barrier formed by the new product is also said to reduce the time and cost needed to maintain heating elements. Another claim: costly ventilating systems are unnecessary, in most cases.

Which Furnace Will It Be?

Electric furnace economics have been improving steadily. So much so that one steel producer now plans to go in this direction rather than to high-pressure oxygen methods. Preliminary cost studies suggest lower operating costs than those obtainable with the cupola-converter combination.

Harden Work on Lathes

Soviet researchers use high frequency methods to cut surface hardening time from 8 hours to 40 minutes, using potassium ferrocyanide as an agent. The treatment is frequently carried out on lathes. One Russian factory practices simultaneous broaching and high frequency heat treating.

Another Engineer Shortage?

The missile-rocket research push will touch off another shortage of scientists and engineers, experts say. Bidding will get tougher as salary offers rise. Low birth rate of the 1930's will hold down the available supply of young scientific talent. Even an educational speedup won't help the situation until 1970, at least.

Hot Metal Via Highways?

If a suitable vessel can be found to keep aluminum molten for many hours, foundries could take delivery of liquid tonnages at a 10 pct saving over the cost of cold pigs. One major producer likes the idea, says hot metal will be the next "primary aluminum product." Another primary source disagrees, claims there are too many problems in the hot-metal shipment plan to make it commercially feasible.

Whirl-Cleans Coolant

Up to 2200 gph of grinding or honing coolant can be clarified by a new centrifuge which works at 99.98 pct efficiency. Small bit of solid matter left in the whirl-cleaned coolant is not enough to cut the liquid's efficiency. Sludge capacity of the centrifuge bowl is 4 gal. This material is ejected from the bowl by braking the unit rapidly.

Coating Boosts Tool Life

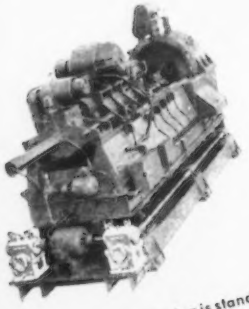
A Scottish firm reports a way to control friction in cases where neither pressure-lubricant films nor rolling bearings can be used. It uses a coating which adheres tightly to metal surfaces and combines high load-support capacity with low shear strength. Treatment is said to have boosted high speed steel tool life 30 times. Some twist drills have run a year without regrinding. Even grinding wheels can benefit from the treatment, it's claimed.

Tool and Die Business Up

Reports from Detroit and other major metalworking centers show that tool and die shops are doing better business. The low ebb for automotive work came in October. First quarter of 1958 is expected to be above the final quarter of this year by one-third or more.

Steel Import Problems

Booming imports of lower priced steel products —wire, nails, machine screws, oil country goods —are giving U. S. steelmakers fits. Sales of some import products approach or exceed domestic figures in some coastal areas. Steelmen are thinking in two directions: either higher protective tariffs or quota limitations. In pressuring politicians for relief, they're getting help from an unexpected quarter: labor unions whose members are hurt by layoffs.



Cleveland worm gearing is standard on these fully-automatic machines which thread oil field pipe to rigid A.P.I. specifications, ranging from 1¼" to 13⅜" O.D. In addition to worm gearing inside the machine, note two Cleveland Worm Gear Speed Reducers in foreground.

On job 18 years, CLEVELAND drive is good as new

AFTER 18 years of continuous service in a well-known pipe mill in Pennsylvania, a Stamets pipe threading machine had its first major overhaul. When the Cleveland worm gearing was removed from the machine it looked almost like new, showed only slight traces of wear. This unretouched photograph reveals the splendid condition of both the worm and gear. In fact, the gearing is in such fine shape that it was put right back in the machine—probably good for another 18 years of strenuous pipe threading.

This example is one of thousands of Cleveland worm gear drives, many made 25 and even 30 years ago that are still in service today. They serve in every phase of American industry, drive every type of mechanical equipment where a powerful, trouble-free, right-angle drive is wanted.

For full presentation of the many types and sizes of Cleveland worm-gear drives available, write for Catalog 400. The Cleveland Worm & Gear Co., 3282 E. 80th St., Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication.
In Canada: Peacock Brothers Limited.

CLEVELAND
Worm Gear
Speed Reducers

STEEL MILL TOUR: Teacher visit to a steel plant gives them opportunity for an on-the-spot view of industry.

Aid to Education: What Industry Can Do to Help

Company Size Isn't an Important Factor

Our technological race with Russia has put the spotlight on improving our schools.

Financial aid isn't the only way industry can help, says Dr. Albert Ayars, Hill & Knowlton's education director.

Most companies, he says, can begin successfully with programs in the plant.

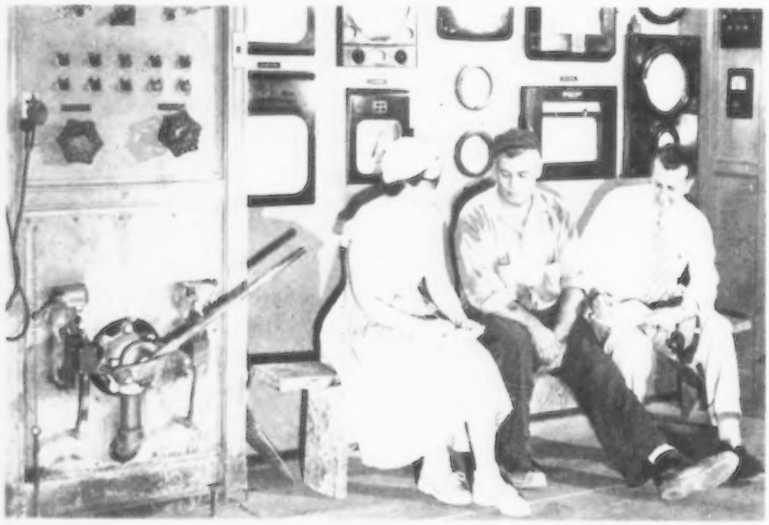
Here's his blueprint for industry-education cooperation.—By G. Grant Carr.

▪ Events can have curious sequels: Russian satellites have triggered a first-class hassle in American Education. Two facts now seem certain: Our schools and colleges are due for substantially more attention and support from all quarters. And a substantial amount of this new help must and will come from industry.

Reasons for industry's key spot in the new state of our schools are not hard to find. They boil down to the fact that industry is a basic and vital part of American life. Our schools must inevitably devote significant time and energy to its study. Certain kinds of educational aid, notably in science and technology, can come only from industry. Industrial plants are top educational resources in their communities. Finally, industry has a prime stake in the kind and amount of education its present and future employees receive.

Steel One of Many—Industry-education cooperation is not new. Hundreds of companies of all sizes have been working with the schools for many years. The steel industry,

BRIEFING SESSIONS: Important in helping educators better understand industry are fill-ins on steel mill layout (top) and chats with workers right on the job.



for example, carries on an extensive program through the American Iron and Steel Institute. And steel is by no means alone in its efforts.

But school aid is not limited to larger companies. Smaller firms can make a vital contribution, stresses Dr. Albert Ayars, Education Director of Hill & Knowlton, Inc., public relations counselors to AISI and others. Formerly a school system superintendent in Washington, Dr. Ayars knows industry-education cooperation from both sides of the fence. He emphasizes that almost any firm can make an important contribution to the schools. Plant size is just one of the factors which determine scope and kind of aid.

Money Isn't Everything — To many businessmen, the answer to the need of schools is simply money. And they are absolutely right. Financial help is essential, particularly to colleges and universities. But non-cash opportunities are often overlooked. And they can be just as valuable, especially in elementary and high schools.

No matter what the kind of aid, the "where to start" is still hard to answer. Education is a big field—one of the biggest—and each segment has its legitimate and persuasive solicitors. Dr. Ayars suggests that most plants will find it simplest to start at home, within the plant, then branch out the community and ultimately, where possible, on a national scale.

Make Aid Broad — Educators stress one basic point: Science and technology are by no means our only critical areas. Nor are they necessarily the hardest to relieve. As one example, we are at least as short of linguists as we are of engineers, and need them just as badly. And there are many other examples. So make your aid as broad as possible.

Companies can make important contributions by enforcing a few rules of good management within their own plants. These can be summed up as insuring maximum use of available talent.

Specific suggestions include:

Make most effective use of skilled personnel at all levels. Seek out employee talents and skills currently being overlooked. Guard against abuses in recruiting programs. Provide part-time jobs for students and faculties. Broaden and improve company training programs. Cooperate with employees who want further education.

Open Plant Doors—A good next step would be simply making the company available to the community's schools. Businessmen often forget, educators say, that an industrial plant is a prime educational resource in its community. Opening the doors to plant tours by teachers and students can be a major benefit.

Never throwing anything away should be a cardinal rule. That includes obsolete equipment, old books and magazines, scrap lumber, even charts and graphs worked up for meetings—chances are the local schools can make good use of all of them. And don't neglect the possibilities of loaning equipment and personnel for lectures and demonstrations.

In any work with schools, first determine the specific needs of the school system. There is no need to fret over protocol; educators are eager for offers of help from industry. The most convenient way of approach is probably the best. Go direct to the local school superintendent. Or perhaps one of your employees is a P.T.A. official, or his wife a teacher. In any case, you can be sure of a warm welcome.

Just Give the Facts—To keep that welcome warm, Dr. Ayars

warns, you should follow one essential rule at all times: Industry's contributions must be limited to facts and artifacts. Use and interpretation are functions of educators, which they must exercise themselves. They don't want opinions and propaganda, no matter how worthy the cause. Don't inject your own opinions on, say, economics or political science. In other words, stick to your last.

The Personal Touch—Don't assume that your company's contributions must necessarily be a separate program. Skilled assistance by individual executives through existing P.T.A.'s and similar groups may well be the most valued aid. Many schools boards, for example, welcome help in planning school budgets and bond issues. Approval for these is often needed at the polls, and company facilities can be a big help in campaigning.

Plant scientists and engineers can sometimes serve as substitute or auxiliary science and math teachers. Skilled workers are strong allies in vocational courses. There are many ways in which on-the-job skills can be carried over to school aid.

Don't Forget Teachers — Industry-education cooperation is properly student-centered. But it's often forgotten that teachers need assistance too. Better pay is No. 1, but recognition of good teaching, more and better teacher education and higher prestige for the profession are all major needs.

Many companies now sponsor workshops in which teachers can enlarge their knowledge of industry and devise better ways of teaching it effectively. Raiding faculties for full-time personnel is discouraged, but vacation jobs and consulting and research assignments for teachers can be mutually profitable.

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., THE IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

Fast Tax-Am Revival Is Sought

The lagging satellite program places a new light on fast tax writeoffs.

ODM officials seek to save the expiring law from the legislative scrap heap.

▪ The rapid and unexpected jump into the sputnik age may revive the expiring fast tax amortization program.

Top mobilization officials are now quietly sounding out congressional leaders on the possibility of killing, or at least limiting, a 1957 law designed to end fast tax amortization at the end of 1959.

To Spur Research—Initially, at least, the defense planners are testing the congressional temperature for a proposal to offer five-year tax write-offs for basic research and for projects which would advance atomic technology through peaceful pursuits, particularly in reactors.

Under the legislation passed this year (sponsored by Sen. Harry F. Byrd, D., Va.), tax amortization is limited to facilities for direct military or Atomic Energy Commission procurement. Also, for research, development or experimental facilities if they are a direct part of the national defense program of the Pentagon or the AEC.

Stability Stressed—Defense Department brass and top Office of Defense Mobilization officials say most pure or basic research projects are cut off from tax-am under this restriction.

If Congress is receptive to using tax benefits to spur U. S. research in order to help this country catch up with the Russians, the government believes the death date on the program will have to be removed or at least extended. To be fully effective, they believe, such a program would have to run for several years and show signs of some permanency to interest private business and industry planners.

Broad Interpretation — Many of these so-called basic research programs which the government would hope to encourage under the program could not be related directly to defense. They would range all the way from moon rockets or space platforms, to deep theoretical probes of ionic drive for rockets, advanced physics, and chemistry.

The theory is, however, that as the world is driven deeper into the scientific age, many of the results of such pure research would have direct or indirect military usefulness. Many would also be commercially profitable.

The planners hope that tax-am would stimulate industry to spend more of its own time and money in basic research. Steel firms, for instance, might set up highly theoretical programs of research into basic metallics and advanced metals and alloys.

Many would appear on the surface to have little or no commercial value for many years. Yet eventually these might sell to the defense and even the consumer markets.

Iron Ore From Brazil

Large quantities of high-grade iron ore concentrates will be available at minimum production costs in Brazil. This is the conclusion of a survey on the potential of itabirite ore in that country. It was conducted by the international research dept., Armour Research Foundation, Illinois Institute of Technology, Chicago, for the Brazilian government.

Ailing Mill Gets a Transfusion

Carpenter Steel Revives Operations at Northeastern

Using a time-tested success formula, Carpenter aims to put the idle New England Mill back on its feet.

Northeastern becomes Carpenter Steel of New England, a fully-owned subsidiary.

▪ "We think there is a market for more specialty steels, that is why we bought Northeastern Steel Corp."

The statement by John Moxon, executive vice president of Carpenter Steel Co., Reading, Pa., explains why his company is paying $8,800,000 for a bankrupt mill in the face of today's deteriorating market.

The company plans to spend about $6.5 million more for improvements.

Carpenter is banking on 68 years experience in specialty steelmaking and marketing to make the grade where 3-year-old Northeastern couldn't.

More Capacity Needed—"Back in May, 1956, we were one of the few firms that predicted a sales decline in 1957 of more than 10 pct," says Mr. Moxon. The current downturn in steel sales was taken into consideration, he said, "when we made our short-range and long-range expansion plans."

As recently as March of this year, Carpenter was operating at 100 pct of capacity. Order backlogs were high. To meet growing customer needs, the company had to either build a new mill from the ground up or buy an existing mill.

The Solution — Foundering Northeastern filled the bill. The disadvantage of a two-plant location was offset by two big factors: Northeastern was bought for one-third the amount it would have cost to build a new mill, and it could go into immediate production. A new mill would have taken 2-4 years to get into operation.

Last month, a Carpenter task force moved into Northeastern's plant in Bridgeport, Conn., changed its name to Carpenter Steel Co. of New England, and began preliminary melting operations in two electric furnaces.

Experience Counts — What Northeastern did wrong Carpenter expects to avoid.

"They were making some pretty good alloy and stainless steels," said one Carpenter executive, "but their laboratory facilities were limited."

Worse than that, Northeastern had trouble finding customers.

Confronted with the problems of a new supplier trying to break into the specialty market, the firm made the mistake of going into the tonnage steel business, according to the Carpenter official. Northeastern had acquired two openhearth furnaces from The Stanley Works, who owned the mill prior to 1954.

Costs Rise, Loss Grows—During 1955-56, when Northeastern was selling tonnage steel at $135 a ton in competition with the big mills, Carpenter was selling specialty steels at an average of $1200 a ton. Yet both were about the same size and type of mill with the same fixed costs.

To make matters worse, Northeastern was hit hard by soaring scrap prices which placed an added strain on the firm's limited capital. And a blooming mill breakdown during this critical period, together

LOOKING IT OVER: Inspecting equipment at Carpenter Steel's newly acquired mill in Bridgeport, Conn., are E. A. Schwartz, left, general superintendent, and A. A. Britton, Jr., vice president-production.

with late delivery of a new bar mill, sounded the death knell. In 1955, Northeastern lost $1.2 million. In 1956, the loss was $1.8 million.

Carpenter Thrives — Carpenter, on the other hand, has shown net earnings of $3.5 million in 1955, $6.2 million in 1956, and $7.4 million in 1957. It makes a variety of 200 basic steels that range in price from $300 to $10,000 a ton.

Carpenter has a well-established national marketing setup that includes 19 mill-branch warehouses, plus offices and distributors in 40 cities in the U. S. and Canada.

Freight Advantage — The new subsidiary will double the capacity of Carpenter Steel to about 170,600 ingot tons. "With Carpenter's steelmaking know-how, marketing experience, and financial backing the Bridgeport mill is bound to operate at a profit," Mr. Moxon says.

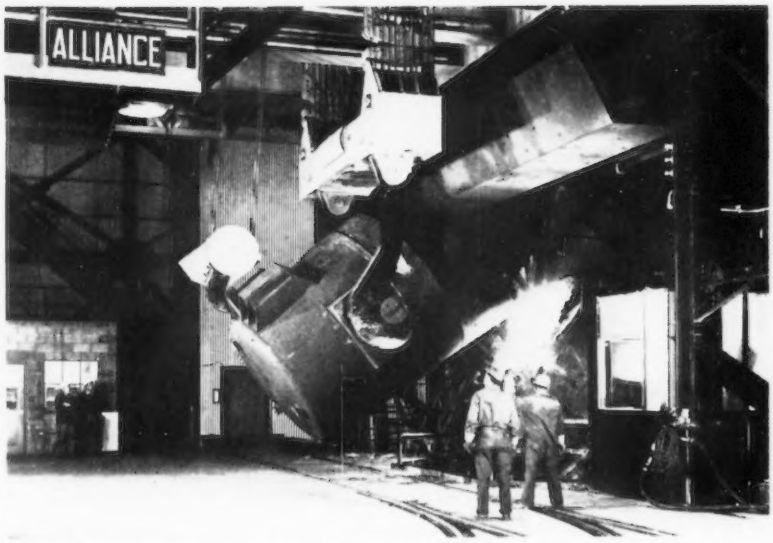
For the time being, Carpenter of New England will concentrate on the New England and New York districts, where it can offer a decided freight advantage over competing mills, he added.

Basically, the company will produce a variety of stainless and alloy steels at Bridgeport. "What we will actually make, however, depends on what we get orders for," Mr. Moxon points out.

Some New Equipment — One item that won't be produced is tonnage steel. Carpenter plans to keep the two openhearths at Bridgeport shut down. Management hasn't yet decided whether to dismantle them or let them stand.

Carpenter will expand the metallurgical production control laboratories at Bridgeport and install additional annealing furnaces. Much of the existing equipment is less than two years old. Northeastern had spent $10 million for capital improvements since 1955, which included two 35-ton electric arc furnaces and a new bar mill.

When the Bridgeport plant gets back into operation it will employ a minimum of 200 and a maximum of 800 workers.



NEW PROCESS: Jones & Laughlin is first of major mills to start up basic oxygen steelmaking plant. Furnace receives hot metal charge.

J. & L. Starts Up Oxygen Steel Unit

▪ Jones & Laughlin Steel Corp. this week started up its $11 million basic oxygen steelmaking process. Production began Tuesday at the company's Aliquippa, Pa., works.

The furnaces, designed and built by Kaiser Engineers, have an annual capacity of 750,000 tons. But the net capacity gain at Aliquippa will be 400,000 tons since only one furnace will operate at a time.

"Major Technological Step"—Avery C. Adams, J. & L. president, described the process, a European development, as "a major technological step in steelmaking which undoubtedly will have a great influence on future expansion in the steel industry." He doubted, however, "that it will entirely replace the openhearth method."

One advantage of the process is its low installation cost, says J. & L. The company says it represents a capital investment of only $15 per annual ingot ton "as compared with at least $40 per annual ingot ton for new openhearth facilities."

How It's Done—Basic oxygen steelmaking is carried out in a cylindrical furnace lined with basic refractories. The charge is scrap and molten iron. High-purity oxygen (99.5 pct) is directed at the surface of the bath through a water-cooled lance. The resulting reaction refines the iron to steel.

The furnaces will produce at least 54 tons of steel per heat—in about 37 minutes. In a 24-hour operation, production will aproximate 40 heats. Lining life is estimated at 300-400 heats.

Behind J. & L. Decision—Auxiliary equipment includes an oxygen generating plant built by Air Products, Inc. Electrostatic precipitators built by Research-Cottrell will prevent air pollution.

J. & L. studied several other steelmaking processes before deciding on the basic oxygen process.

S. S. UNITED STATES: Luxury liner contains 2000 tons of aluminum, in her smokestack, and accessories.

Aluminum Woos Shipbuilders

Alcoa naval architect heads group working up standards for aluminum in shipbuilding.

They'll finish in 1958, expect a jump in sales to maritime markets.—By F. J. Starin.

■ Sometime next year, David McIntyre, naval architect for Aluminum Co. of America, will present a paper to the Society of Naval Architects in New York. The reaction of the American Bureau of Shipping, and major maritime insurance firms to the report will probably spell out aluminum's future penetration of the maritime market.

Here's the story, according to Mr. McIntyre: "When a man wants to build a steel ship he starts with standards and specifications developed over the years, and recognized by the American Bureau of Shipping and all insurance companies. He need only apply these yardsticks to the type of ship he wants, and start building. To build an aluminum ship requires design and engineering from the ground up, costly and time consuming. Standards and specifications just don't exist."

Mr. McIntyre heads a SNA committee which has been working for $2\frac{1}{2}$ years to correct this. They'll finish in 1958.

Aluminum at Sea—In the meantime, the aluminum people have been building their case. The world's most impressive luxury liner, the S. S. United States, contains over 2000 tons of aluminum.

A number of other ships are toting aluminum hardware. The S. S. Sunrip, a cargo ship, has an aluminum superstructure. Built by a Canadian yard for Sun Steamships Co., at the instigation of Aluminium Ltd., it has been hauling bauxite for more than a year. Despite the fact that most of the aluminum is unpainted, maintenance savings were evident when the ship was drydocked for repairs.

Used on Battle Craft — Warships, where expense is less of a factor, have given aluminum its biggest maritime boost. Supercarriers of the U.S.S. Forrestal class contain 2 million lb of aluminum.

In addition to more efficient welding and joining, the aluminum industry has made its product more attractive to shipbuilders by extending the range of extruded shapes available, developing new alloys said to be comparable to mild steel in performance, and putting in new rolling facilities for wider plate.

Won't Push Steel — Aluminum people point out they don't expect to push steel out of the dominant position. It still costs more to build an aluminum ship. Labor and time savings, and the higher salvage value are not enough.

Mr. McIntyre estimates it costs about 20 pct more to build an aluminum ship, but that an average of about 20 pct more cargo can be carried. The owners of the S. S. Sunrip say it will take about 8 years to make up the premium the aluminum superstructure cost them. Thereafter, they expect the income from the added cargo she carries to be about $100,000.

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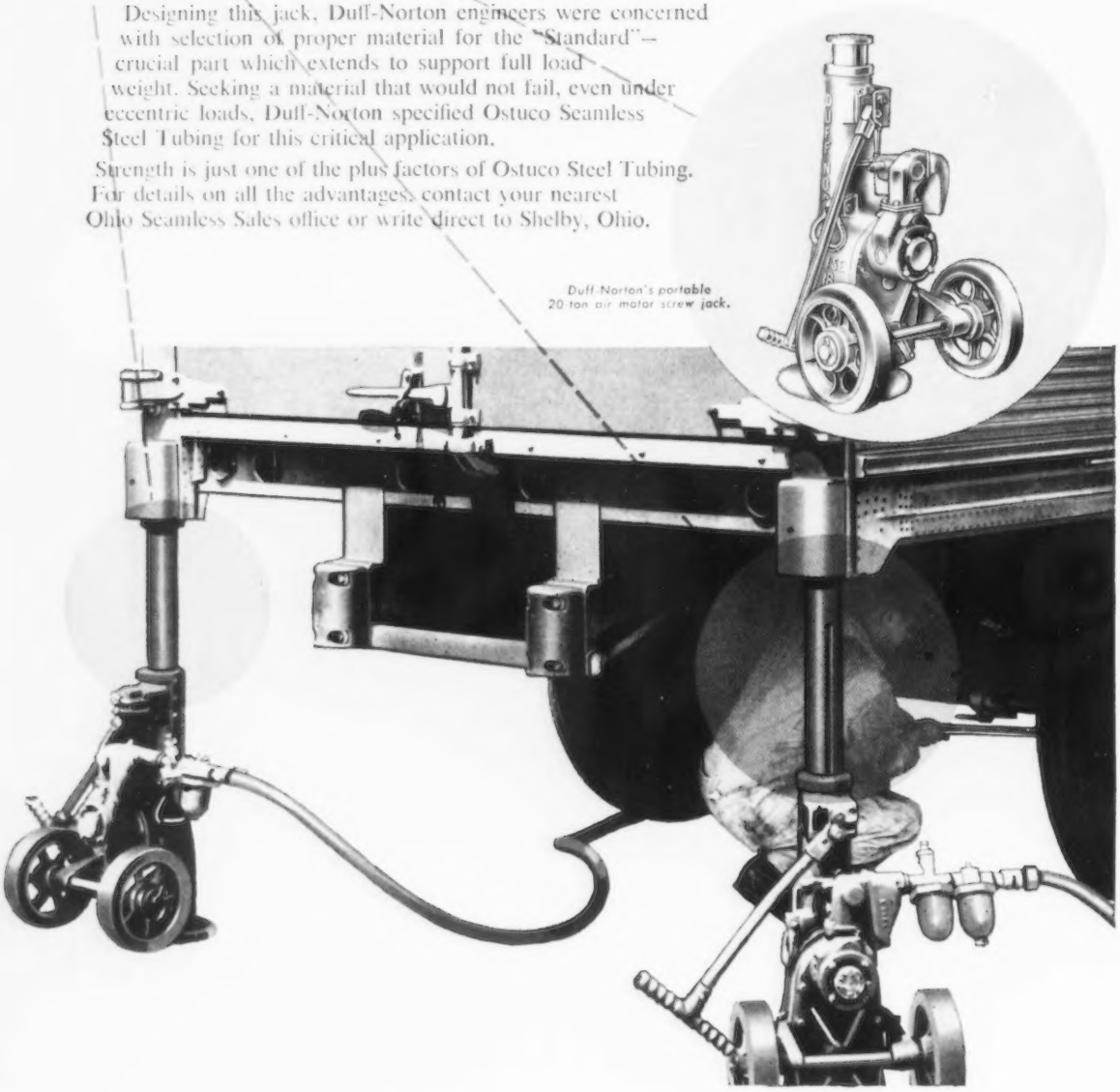
Designing this jack, Duff-Norton engineers were concerned with selection of proper material for the "Standard"—crucial part which extends to support full load weight. Seeking a material that would not fail, even under eccentric loads, Duff-Norton specified Ostuco Seamless Steel Tubing for this critical application.

Strength is just one of the plus factors of Ostuco Steel Tubing. For details on all the advantages, contact your nearest Ohio Seamless Sales office or write direct to Shelby, Ohio.



Duff-Norton's portable 20 ton air motor screw jack.

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U. S. Speeds Russian Translations

Government officials are laying the groundwork for a hurry-up program of translating foreign scientific reports and journals, particularly those received from Russia.

Massive piles of these reports and magazines are laying unused in the Library of Congress. Last year, some 8,900 Russian magazines—4,800 of them purely scientific—and another 11,000 reports and pamphlets—6,000 of them scientific—were received by the Library.

Sputnik Details—In only a few instances are these publications translated. Many of the Russian publications carried detailed technical articles on the sputniks and the Red missile program in general long before the firings.

The translation program is being spurred by Dr. James R. Killian, President Eisenhower's top scientific advisor. Although details of the program have not yet been worked out, it is expected that the U. S. Commerce Department's Office of Technical Services will be handed the job.

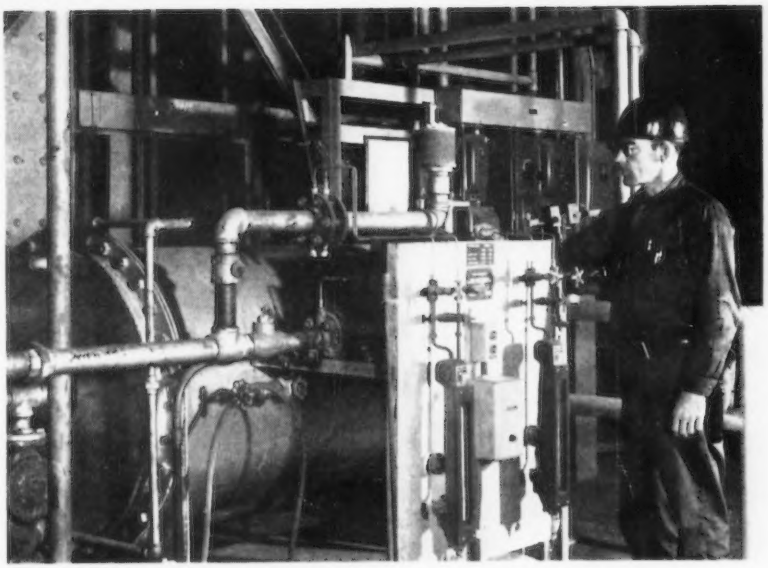
Extrude Titanium Parts

The cost of titanium jet engines parts has been reduced by a new production technique, says Wright Aeronautical and Metals Processing Divisions, Curtiss-Wright Corp.

The parts are now extruded directly from cast ingots. The method was developed in two years of work under an Air Force program sponsored by the Manufacturing Methods Branch, Air Material Command. Previously the parts were forged.

Advantage Over Forging — Advantages of the new system include greater utilization of raw material and lower cost of cast ingots over forged billets. Also, the procurement cycle for the parts is considerably shortened.

Curtiss-Wright says its new process has wide possibilities for non-defense use as well.



TAKES GAS: Exothermic gas generator supplies inert atmosphere for wire heat treating furnace at Los Angeles mill of Bethlehem Steel Co.

Gas Generator Boom

▪ Gas generator makers, a little-publicized part of metalworking, have quietly quadrupled their business in the last 5 years. And they expect another healthy increase next year.

Their products burn natural gas or other fuels, in carefully controlled air-fuel ratios, to produce combustible, non-combustible or inert gases. Coil annealing furnaces in steel mills use them to replace air for surface protection. Other big uses are heat treating, brazing, hardening and tempering, and carburizing.

Basically gas generators are heavy steel, water-jacketed tanks lined with refractory brick. Hardware includes piping, combustion carburetors, heat controls, elaborate instrumentation, a compressor and a cooling medium.

Could Double—"The field is in its infancy, and a doubling in business in the next 2 or 3 years is not at all impossible," says A. A. Straub, president, A. A. Straub Co., Inc., Cleveland, only integrated company in the field.

Major gas generator markets are: Petroleum and gas industry—30 pct of total sales; metals—25 pct; chemicals—25 pct; food—7.5 pct, and the remainder in ceramics, paint, and rubber.

Foundries Are New Market—A big new market opening up is aluminum foundries. Molten aluminum is now "bubbled" with nitrogen to float impurities. Cost is about $6.60 per 1000 cu ft. Straub estimates cost on a gas generator, assuming a high utilization factor, is 15¢ per 1000 cu ft.

A. A. Straub has grown 10-fold in its 10-year existence. Others are Westinghouse, General Electric, Surface Combustion of Toledo and Gas Atmospheres of Cleveland. Many units are made by independent fabricators from specific designs.

Gas generators range in size from 250 to 40,000 cu ft per hour, weigh up to 18,000 lb, without refractories. A small exothermic generator sells for $2000. A large, completely integrated nitrogen generator costs in excess of $65,000.

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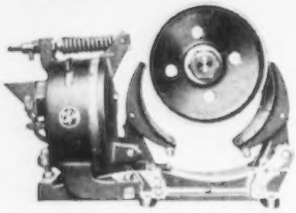
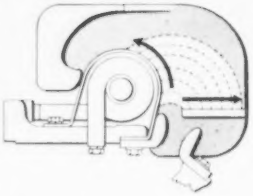


LONG-LIFE BRAKES for cranes operated by A.C. or D.C. power. High speed performance. Low upkeep.



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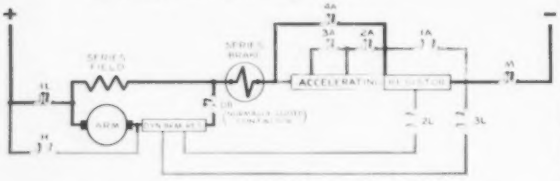
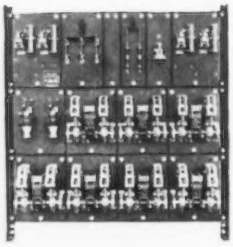
DYNAMIC LOWERING CIRCUITS for hoist motions. Respond quickly. Permit accurate inching for spotting loads.





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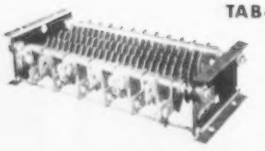

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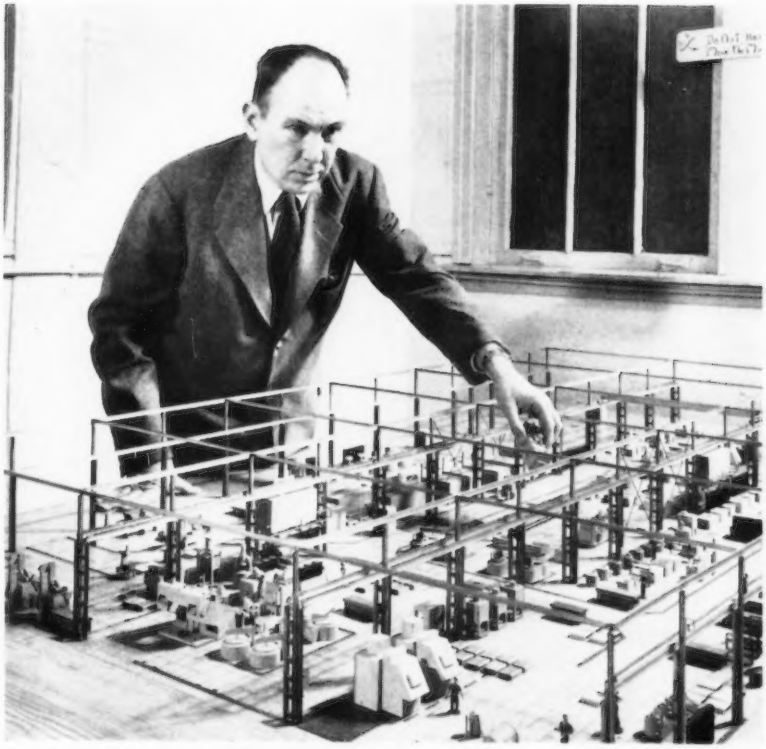
L. A. Lindberg

A Heat Treating Success Story

One of the men responsible for heat treating advancements of the past 30 years is Roy Lindberg.

A practical shop man and a metallurgist, he helped establish two firms.

He makes the laboratory the nerve center of his company's operations.



L. A. LINDBERG: The laboratory is all-important.

▪ With the help of men such as L. A. (Roy) Lindberg, the art of heat treating has reached its present important niche in the science of metallurgy.

To these men, the laboratory is all-important. If your company is going to progress, they say, it must provide a place for new ideas and new products to be developed. A firm that hopes to make a name for itself in its field must give continuing support to research.

Father and Son Team — Mr. Lindberg, who is president of Lindberg Steel Treating Co. and Lindberg Engineering Co., Melrose Park, Ill., had a practical knowledge of metal treating before he enrolled at the University of Illinois in the 1920's.

Together with his father, A. N. Lindberg, Roy founded Lindberg Steel Treating Co. in 1922. The son worked with the company full time for several years before going to college. He considers the experience a big factor in his business life. It gave more meaning to his classroom theory and helped set his direction in metalworking.

Lab Controls All—In 1924, he recalls, the company treated the bars for the county jail building. Beside deterring the Chicago crime rate, this $2000 sale helped put the new company on its feet and also helped Roy through college. In 1927, he was graduated with a degree in metallurgy.

Back to work once more, the young metallurgist brought high technical ability to aid the company's growth. The laboratory became the nerve center for the order, production, and inspection departments. This control, together with consulting services offered by the company, are important reasons behind Lindberg's growth record.

An Idea Pays Off—Roy Lindberg helped to develop and build technical and production equipment in his own plant. One of his ideas that blossomed into a bonanza was a recirculating type furnace. Roy Lindberg built it for his shop because there was nothing on the market that could do the job.

His furnace was so successful it was decided to manufacture and sell others like it. The Lindberg Engineering Co. was formed in 1935 to produce the equipment known now in the industry as the Lindberg Cyclone Furnace.

However, he still spends the largest part of his time at the heat treating plant—where there are new alloys to temper, higher hardness requirements to be met, and annealing refinements to be tried. The lure of applied research is undeniable to Roy Lindberg. For his company it is bread and butter.

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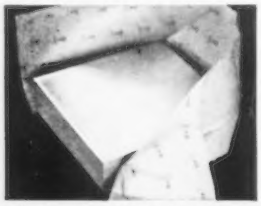
Even under adverse conditions, such as outside storing or shipping, Ferro-Pak provides complete protection. It is waterproof, strong, yet highly flexible and easy to handle. The chemical rust inhibitor is compatible with oil and stays effective for long periods even when the humidity soars.

Whether you're a shipper or a buyer of steel, it will pay you to specify Ferro-Pak wrapping wherever rust is a problem. For an interesting idea brochure on many uses for Ferro-Pak, write Cromwell Paper Company, 4803 South Whipple Street, Chicago 32, Illinois.

How to rustproof a freight car—Ferro-Pak is used to line sides of car and to interleave coils, transforming ordinary freight car into huge rustproof package.



How to rustproof black plate—On this light gauge, dry, uncoated steel, rust can start from a fingerprint. Ferro-Pak keeps black plate rust-free even when the humidity soars!

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For over 38 years—
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Don't Bet Everything on Trends

You can only count so much on business trends. They don't necessarily follow through to all products.

An analysis of "best years" shows that overall good business isn't always a guarantee.

▪ The general business climate appears to be one of waiting out the mild slump and hoping for next year's new defense boom to set in.

As far as it goes, that's not a bad attitude. All signs point that way. The current crop of economic indicators still tends down. On the other hand, talk of a $2 billion increase in defense spending, deficit financing, and even a possible new wave of inflation, indicates an early end to the downtrend.

Don't Bet on It—The fallacy of that thinking is that your business won't necessarily follow the trend, either up or down. One of the lessons to be learned from the current boom (It's still a boom, even if on the downside) is that all elements of the economy don't necessarily follow the pattern of the indicators.

A good example of this is in consumer durables. It might have been expected that the general record rate of the economy would result in record rates of automobiles, appliances, TV sets, and others.

Market Over-estimated — As everyone knows, particularly manufacturers of these products, this logic did not prevail. Automakers and appliance makers correctly forecast the general record business of the past two years. But they incorrectly forecast their share.

It would be unfair and inaccurate to say these businesses are hurting, but they have not been able to come up to expectations. The auto industry may not see the likes of 1955 again for years, but that's the level it built for in its expansions of 1955 and '56.

Non-Durables Steady—In contrast to the fluctuations of consumer durables, non-durables have shown a steady rate of growth that is the envy of industry. Remember, non-durables are generally considered to be the items that can be cut down, or dispensed with altogether, with volatile markets.

Nevertheless, motor oil, cigarettes, food, shoes, and others have enjoyed a consistent upward demand in recent years.

New Products—Apparently the best way to avoid economic caprices is through the creation of new products. In recent years, only new products have shown continuous growth among consumer durables.

But among these, only air conditioners and dryers continue to show gains. Others, like TV sets, automatic washers, for example, are now geared to the same set of factors as other appliances.

When Were the Best Years?

No Pattern — The fact that specific branches of industry do not follow the pattern of the general economy is illustrated in a Dept. of Commerce tabulation of the top postwar year for selected products or commodities.

Patterns of relationship between products are apparent, but there are strong indications that specific products do not always move with the general level of business.

These are the peak years for some products or commodities:

Consumer Durables—Passenger cars, 1955; batteries, 1957; TV sets, 1955; phonographs, electronic, 1957; washers, 1956; ranges, 1950; dryers, 1956; dishwashers, 1956.

Producer's Durable Equipment—Civilian aircraft, 1946; aircraft engines, 1957; freight cars, 1948; diesel-electric locomotives, 1951; wheel type tractors, 1951; track-laying tractors, 1956; industrial trucks, gas powered, 1955; industrial trucks, electric, 1953.

Industrial Materials — Steel, 1955; copper, 1956; wire, 1951; gray iron castings, 1951; malleable castings, 1955; primary aluminum, 1956; lead, 1950; zinc, 1956; tin, 1950; fabricated structural steel, 1957.

Obviously, years like 1954, where inventory control was a major factor, did not result in a top year among any of the 153 commodities. And the "good" business years like 1951 and 1955 predominated. Nevertheless, the tabulation shows some surprises, even with the benefit of hind sight.

Apparent also is the best showing in recent years of the new products. Like fabricated structural steel, many construction materials enjoyed their best years in 1957, which will establish a record for total construction. The same could be true of 1958 if year-end forecasts materialize.

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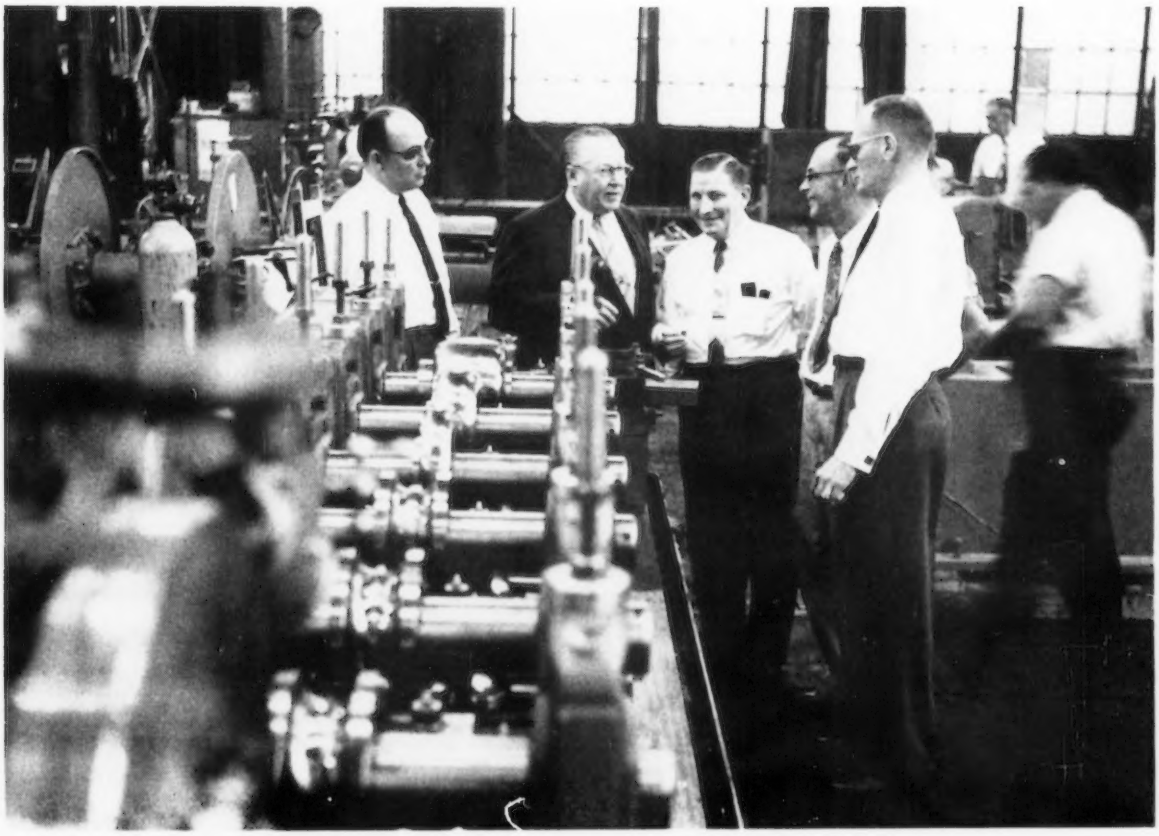

For details on photos see p. 102.

How To Plan For Lower Costs

Any company can cut costs. But how to do it on a sound basis is something different. All too often a meat axe is used in place of pruning shears. The result oftentimes is a further drop in profits and a harmful effect on long-range growth.

A good cost-cutting program concentrates on those areas where the most savings can be made. It also provides a control system for flagging down billowing costs before they get too far out of hand. It frees management to direct its attack on the most serious cost areas—and does not penalize well-run departments.

In setting up cost-cutting programs for several hundred metalworking companies, Trundle Consultants, Inc. has run across just about every problem on the books. While they may differ from company to company, a definite pattern emerges which is applicable to all industry.

This special report is based on a survey of the management firm's findings in over 100 top metalworking firms.

Where to Look For Biggest Cost

In any cost-cutting program management must know where to look first.

Some areas will pay off immediately. Others will yield lesser savings, take longer to analyze.

Here is a rundown on those items most likely to lend themselves to immediate cost cutting.—By Charles P. Hawkins.

▪ Human nature being what it is, most everybody is too busy making money in good times, to worry about expenses. It is only when profits dip that industry looks to cut some of the costs that are shaving profits.

All too often, there is a "fire-alarm" reaction to declining profits. This is followed by a "meat axe" cost-cutting program that is ill-considered, ineffective and harmful to the long-range welfare of the company.

A panicked management will cost-cut by:

1) initiating across-the-board cuts which penalize well run, lean departments and leave virtually untouched those that are overstaffed and fat.

2) reducing or eliminating entirely activities upon which the future health and development of the company depends—such as research and development, advertising and promotion.

Need More Planning—Most companies lured into "meat axe" cost cutting do not have well-conceived, continuing profit planning and cost control programs. Unfortunately this shortcoming is widespread in the metal working industry.

The company without sensitive controls often has no idea that it is headed for trouble until it is engulfed. And at that point the company feels compelled to cut costs, but has no idea what, where, or how. And, of course, it is no secret that in the past many companies acting without guidance of controls have cut certain costs only to find they have hurt rather than helped profits.

With strong, yet sensitive controls, "management by exception" can be instituted. Under this kind of setup, bad situations are flagged as soon as they start. Management need not follow all the details of the company's accouting operations. All they have to watch are the danger signals issued by the controls. This frees management to direct an attack on the most excessive costs.

Big Cost Areas—A general principle to follow in looking for immediate cost cuts is "Don't look for whales in the bathtub"—look for big costs where you spend big money. A 30 pct savings in a department of four is less important than a 10 pct cut in a shop with 40 people.

Getting down to specifics, there are six main areas in the metalworking industry for immediate cost cuts. In the order of their importance they are:

1.) Nonproductive labor; 2.) Cost of materials; 3.) Indirect labor; 4.) Production control; 5.) Supplies; and 6.) Maintenance.

Let's take these one by one:

1. NONPRODUCTIVE LABOR: Employees who have nothing to do with the actual manufacture of the product—clerical and professional personnel.

Studies show a trend not only toward an increase in salaries for nonproductive labor, but also an increase in the ratio of nonproductive labor to direct and indirect labor.

Why It's Up—There are two reasons for this increase. First, it is often difficult to tell exactly how many people are really needed to do the work in nonproductive departments. As a result, these departments are generally overstaffed. Second, as automation decreases the ranks of direct labor, the need for paper work increases.

In metalworking plants you will often find that production control, purchasing, order and billing departments are over-loaded.

2. COST OF MATERIALS: Look at your scrap reports. Are you ordering your material in the correct lengths to eliminate waste? Is an excessive amount of scrap and rejects caused by wrong materials, poor workmanship or poor planning? Is your purchasing department slipshod?

3. INDIRECT LABOR: Covers personnel who service direct labor (the people who actually work on

Charles P. Hawkins heads up the Management Div. of Trundle Consultants, Inc., Cleveland.

In his sixteen years with the firm he has handled a wide variety of assignments for over 200 industrial companies — a good portion of them dealing with costs.

Before joining Trundle he held executive positions in a number of automotive equipment companies.

Savings

the production line), like material handlers and setup men. Within this area there are danger spots.

It's easy to get top heavy in indirect employees and add fixed, rather than variable expenses to your overhead every time there is a surge in production. It's easy to add another service man, just as it's easy to add another clerk. And then even when volume goes down the indirect workers stay on.

4. BAD PRODUCTION CONTROL: This raises costs, through congestion and inefficiencies. Work schedules that bog down because the raw materials are not where they should be, when they should be, take their toll in costly man hours.

Excessive inventories are very costly. You run the danger of obsolescence, rehandling and scrapping, plus the cost of warehouse space and storage bins. These and other costs of carrying inventories can be pared and save your company as much as 20 pct of the inventory evaluation reduction.

5. SUPPLIES: Supplies should be controlled by budget. In a metal finishing shop, for example, supplies can be an especially good area for savings, because of extravagent use of cutting lubricants, buffers, sanders, emery cloth belts, and polishing or grinding wheels.

6. MAINTENANCE: Investigate downtime due to mechanical failures. Chart the character of the breakdowns and analyze them over a period of time to establish frequency and location. Sometimes, merely adding a piece of stand-by equipment will result in a considerable cost reduction.

Continued

Why Cost-Cutting Doesn't Always Boost Profits

There is a great deal of difference between merely cutting costs and improving profits. In the metalworking industry there are five common causes of ineffective cost cuts:

1. **Savings from cost cuts are passed on to the consumer via pricing formulas that have not been kept current.**
2. **Poor estimating of the cost of carrying out a cost reduction program.**
3. **The benefits from planned cost cuts are not realistically assessed.**
4. **Savings on lower cost raw materials are off-set by greater costs in processing the materials.**
5. **Failure to look at the "Broad Picture."**

Here are a few examples of cost cuts that went awry:

▪ During a particularly slow summer, the industrial engineer of a small fabricating company which employed eight men for materials handling decided that if he purchased a particular kind of power truck he would be able to cut his materials handling staff in half. After allowing for the cost of the appropriate lift trucks, he figured that a substantial saving would result.

NO REAL SAVINGS—The move, however, did not result in a saving. After the lift trucks were purchased, the four materials handlers who were released from their jobs had to be transferred to another department under union contract terms. They were no more needed in the new department than the old.

The fault was the industrial engineer did not look at the "Broad Picture." He saw only the materials handling function. He didn't study the industrial relations implications and so he didn't know there were union regulations in force on questions of seniority.

▪ The cost cutting committee of a firm in the auto supplies field recommended a cost cutting program that would cost $125,000. This expenditure provided for new equipment, personnel reductions, and plant layout changes.

By the time the program was completed the costs were double what they were supposed to be. An investigation revealed that the committee had been too optimistic in its original estimate. Also, several key persons in the company had injected a few pet projects in the cost-cutting plan which added to the cost.

▪ The cost-cutting committee of a small firm found that workers on relatively simple operations were setting up their own machines. They figured out that set-up men should be employed for this purpose so that the production men could spend all their time on production.

Three production men at $2.00 per hour were eliminated, and one set-up man at $3.00 an hour was added. But one set-up man could not keep up with the production men, so a second set-up man was added, nullifying any gain.

Setting Up A Sound Cost Control

Any cost-cutting program must be related to overall company needs.

First step is to determine what profit and cost components are—and how they relate to each other.

From there on it's a matter of attacking specific areas for cost control.

■ Cost cutting should not be an isolated activity. It should be carried on in good and bad times alike. Improved efficiency and increased profits will result from the constant picking away at those areas where cost cuts can be made.

The overall direction of a long-range, cost-cutting program lies with top management. In a small company the controller may be in charge. In a larger firm it could well be in the hands of a member of the administrative staff or an administrative assistant. A well-rounded, cost-cutting committee includes the controller, works manager, plant engineer, product engineer, methods and standards engineer and purchasing agent.

Get True Picture—A cost-cutting program must be related to your company's needs. Basically, you must determine what your profit components are; what your cost components are; and their relationship to each other. In other words, you have to know what it is you can cut, how it will affect profits, and the overall welfare of the company. Otherwise your program may miss its goals.

To get a true picture of company costs there are five basic guideposts to keep in mind.

1.) Profit Volume Relationship. 2.) Pricing. 3.) Costing. 4.) Budgetary Controls and 5.) Cost and Capital Expenditures Controls. Let's look at each in order:

PROFIT/VOLUME RELATIONSHIP

Since a company exists primarily to make profits, you must know how the total profit is determined, what its components are, and what factors cause shifts in earnings. Here is an example showing why knowing the profit volume relationship is important in a cost-cutting program.

A company I know had two separate divisions. One manufactured general building products which carried an average marginal income of 30 pct. The other produced home furnaces which carried a 16 pct marginal income.

The sales manager died suddenly. Since furnace sales had been falling off, the company decided to hire a red-hot furnace sales manager. The new sales manager noted quickly that he could sell a lot of furnaces in housing developments. He pushed for high volume of furnace sales and got it. This suited him fine, and his superiors were very pleased.

Marginal Income Dropped — Unfortunately, the more he raised his volume, the more he diluted the overall marginal income of the business. Formerly with 50 pct sales in general building products, and 50 pct sales in furnaces, the company had an overall marginal income of about 23 pct (we consider 25 pct healthy.) But the new sales manager pushed the furnace sales up to a point where the overall marginal income dropped to about 17 pct.

When marginal income is reduced, the break even point is increased. Thus, the company became sicker and sicker in spite of the marvelous sales record it was making. Profits were going down and the management hunted for the cause of reduced in profits every place except where they should have.

Like this firm, too many other companies assemble their costs and prices by rule of thumb.

PRICING

Make a study of the pricing formula for each product to determine your marginal income. Each product must have built into its price enough for profit. When you cut costs, do not pass along the entire saving to the consumer. Retain a percentage of the savings. Otherwise, profits will not be improved one iota.

Another thing to watch is that your savings from cost cuts won't drain off because your salesmen attempt to insure goodwill by allowing customers extra terms, exorbitant discounts and multiple shipments.

COSTING

Determine the fixed and variable factors in each expense category so that you can analyze the distribution of expenses by products, departments, equipment, or other factors. This will show how expense items vary with volume, and whether an accurate and proper allocation of expenses is being made.

Set up indices for the distribution of expenses so that the various departments using items or services are properly charged.

BUDGETARY CONTROL

The best budget control is always related to the volume of business at any given time. It must be based on prompt and accurate reporting of the gap between standards and performance. It should have a built-in set of signals that will indicate a go ahead or a slowdown in the rate

Program

of activity for each department based on business volume.

COST PROCEDURES AND CAPITAL EXPENSES

Study the methods by which you figure and record labor and material costs and other expenses. Are they accurate, complete and prompt? Check to see if the system you're using is best for your type of business. If it is, you'll be getting the information that's meaningful to you. And you'll be getting it in time to do something about it.

Setup project controls to assure that certain expenditures bring about the savings anticipated. Many ideas are sold to management on the basis they will pay for themselves in savings. But this is not always the case.

With these guideposts in mind, you can then proceed to these areas where you can reap tangible results from cost cutting:

ORGANIZATION

A good functional organization is essential when the going is rough and substantial paring of personnel is required. Without it there is a danger of cutting out essential functions. In a well-organized company, retrenchment becomes the reverse of growth. The company is able to redistribute minor functions and release the least essential personnel.

Reverse Pattern — Here is how good organization growth takes place. When your company is small you assign Smith to act as both production control manager and purchasing director. As the company grows, Smith adds a scheduler, a material control manager, a planner and an analyst. By this time there may be sufficient volume to require a full time purchasing director, as well as a buyer at a later date. When retrenchment is needed,

INVENTORY: Cost of carrying inventory often runs as high as 20 pct of its value. It's an area that should receive close attention. Excessive inventory sometimes results from poor sales forecasting.

COST CUTTERS: Direction of a cost-cutting program must come from the top. At Yoder Co., Cleveland it's headed by Douglas Yoder, President, shown at far right p. 97. Others include, above, l. to r.: E. H. Kanzenbach, Secretary - Treasurer; E. L. Machey, Dir. of Engineering; W. J. Kerr, Vice President in Charge of Production; and Mr. Hawkins.

the exact reversal of the growth pattern should take place.

COMPENSATION AND INCENTIVES

Take a look at the salaries you're paying. Are they consistent with the field, or are they out of line? Is compensation too much for the function, or too little to maintain proper standards? How many vice presidents have you, and how many $20,000-a-year men?

If you had to retrench, temporarily, where could you cut salaries —at the top, across the board, or at the bottom? Bear in mind that when a company is in bad shape everyone is making too much money.

CLERICAL AND ACCOUNTING PROCEDURES

Office equipment and personnel should be thoroughly checked. Look for duplication and unnecessary reports — the possibility of combining several reports or forms into one. Many companies have a variety of forms where one would do. Preprinted forms can be used to advantage in accounting procedures in place of drawing up monthly accounting classifications. Investigate business machines available. We have gone into offices where even the most simple, comparatively inexpensive machines like electric adding machines and calculators were missing.

PRODUCTION CONTROL

Production Control is the heart of manufacturing activities. The ingenuity with which you plan is reflected in manufacturing costs. It's a matter of logistics; of getting things in the right place at the right time: machines, materials, manpower. How well you tell your people what to do is the measure of how well the plant operates.

An inefficient production control can eat your profits up as quickly as the absence of a control. It shows itself to the casual eye by extensive back orders, poor deliveries, and excessive downtime.

INVENTORY

Since the cost of carrying inventory runs as high as 20 pct of its value, this is one area that should receive very close attention. Countless times we have found padding in costs which were designed to cover up poor inventory practices, requiring write-offs each year.

Excessive inventory is the result of poor sales forecasting and production planning. It can also be traced to speculation in raw materials. I remember one company president who overruled his own purchasing department and invested in steel on the hunch that it would be in short supply. It turned out that he was wrong. His company, which made fasteners, ended up with a yard full of steel which was exposed to the elements. Eventually, the company had to spend additional money to get the rusted and pitted steel back into useable condition.

LABOR CONTROL

This is a long-range project which can result in real and meaningful economies. An overall study should be made of past and present labor relations policies to determine the best method of selecting and hiring men. At the same time, a master plan for keeping direct, indirect and non-productive labor costs in proper relation to sales volume should be instituted.

Morale Drops Off — Bad employee morale is one of the causes of high costs. In many cases the fault lies with management. Workers in a plant sometimes get the impression that management is not on its toes—other companies are beating them to markets; they hear about competitors who have machines producing five times as much as theirs; they gather that management is not vitally interested in keeping the plant operating efficiently—so why should they care.

QUALITY CONTROL

Make an analysis of the value, cost and quantity of spoiled work, scrap and salvage. Production lost through excessive scrap not only increases the cost, but also reduces production capacity so that there is a loss of profit on potential volume as well.

MANUFACTURING METHODS AND STANDARDS

Here a long-term analysis by the company's industrial engineer is called for. It involves a thorough time study of each operation—the following of a product from receipt of the raw material to shipment of the finished product—recording all handling and inspections and operations.

Analyses Are Needed—One word of caution: In the metal working industry only 15 to 20 pct of ex-

penditures go to direct labor. Therefore, what you save in the methods area would relate only to that 20 pct—and your realized savings may amount only to one percent of your sales dollar. But such analyses are essential over the long run to offset the threat of obsolescence, lower quality and increased costs—even though very little of your cost cuts will be reflected in additional profits. If you neglect this area, you'll soon find you're unable to operate competitively.

PLANT LAYOUT AND FACILITIES

Is your space adequate for the production you're aiming at? Do you need a conveyor system? Do you have narrow aisles, poor storing space which results in inadequate stacking of materials and costly materials handling? Are there sufficient tote boxes and storage bins? Savings in materials handling, or in the use of floor space, may depend on the physical condition of your factory.

Need Plan—Is your equipment old and obsolete? Do you have a working maintenance and replacement plan? This is especially important in automation because a shut-down in an integrated line can be a very high cost item.

PRODUCT DESIGN

Compare the materials you're using with the competition's. We are constantly amazed at the number of products on the market that are being given away at the price. Although comparative studies are made of competitors' prices, there is no corresponding study of materials used.

One case that comes to mind is that of a company that almost went out of business because it was building motors that could withstand twenty-four hours' use a day and putting them in washing machines that didn't require that kind of service. Their motor was completely overdesigned for its use and the company couldn't get a fair price for its product.

Case Histories on Cost Cutting

Organization

A $15-million a year steel casting foundry with four plants in different cities had steadily declining profits because of a continuing decrease in sales volume. The problem was to find a way to maintain a profit standard despite the volume loss.

It was quickly established that the company was badly over-organized and over-staffed, with duplication and multiplication of functions on all levels.

Home Office Bogs Down—Each of the plants operated on an autonomous basis with a full complement of tool and die shops, engineers, quality control personnel, metallurgists, salesmen and administrators. The home office was bogged down with duties that duplicated operations being carried on at the plant level.

It was recommended that all of the staff functions be centralized in the home office. By this means it was possible to greatly reduce the staff personnel. The four plants were reorganized and each one was headed by a works manager whose small staff was geared solely to the local operation.

It required six months to plan the reorganization and streamlining of this company. Annual savings amounted to $150,000.

Production Control

An air frame parts manufacturer, with an annual sales volume of $75 million, had been receiving a disproportionately large number of complaints that deliveries were behind schedule. This, plus steadily mounting costs, spurred a decision to embark on a production control cost-reduction program.

An eight-week survey of production facilities, organization and procedures showed that the nature of the business required a complete overhaul in materials handling and expediting.

There were distinct production peaks and valleys and fluctuating departmental loads due to engineering changes and revisions that were inherent in the business. Constant experimentation and improvement in airplane construction is reflected all the way down the line to the parts manufacturer.

Geared To Change—The company had to be shown how to gear its operations to the frequent changes so that production would not come to a stand-still each time a new engineering method was contemplated. Procedures were set up that allowed for advance notice of changes to the production line, and a steadier flow of work orders to the plant.

Internal handling of parts was streamlined and centralized. The new system provided that all parts for an operation were readily available for assembly at the point of assembly and time of assembly according to a set schedule.

It also provided a method of controlling material movement, with an expediter responsible for specific materials within a prescribed area. This eliminated frantic, time-consuming intra-area checking when materials were delayed.

The over-all annual savings effected were $250,000; $100,000 in materials handling changes, $100,000 in salaries on expediting

operation, and $50,000 miscellaneous.

Direct Labor Costs

An automotive specialties manufacturer, with annual sales of $18 to $20-million, was faced with the problem of making a rapid, drastic reduction in selling prices to meet a special competitive situation. An immediate decrease in production costs was necessary to hold its profit line.

Most of the cost factors were controllable by the company since it had a highly integrated plant which made all of its own parts, including pistons, bearings and other components.

Check Competition—An intensive analysis of each operation on each part was made to assure absolute minimum cost. These studies considered equipment, tooling, number of machines per operator, materials control and service, materials handling, scheduling and production rates. Comparative analyses also were made of the design and material of competitive products to see if savings could be made in this area.

The assembly line was studied for efficiency of materials handling and service, parts scheduling and storage, equipment, numbers of hand and power tools in use, possible automation of operations, use of dial and hopper feeds and other labor saving devices.

A nine pct increase in employees was recommended to eliminate bottlenecks and to establish an increase in conveyor positions. This accounted for forty-three pct more output on this one operation alone. At the same time, a twenty pct overall reduction in direct labor costs was made.

The total cost improvement through material and design changes, and direct labor costs, amounted to a decrease of more than eight pct in the selling price.

Indirect Labor

In an aircraft and commercial components manufacturer's plant, doing an annual volume of $20 to $25-million, a cost cutting survey was conducted in the engineering department.

All phases of a specific project were analyzed, including origination and screening, budgeting, scheduling and follow-up, time and cost control, immediate results and potential business. There was a thorough review of the department's personnel, with emphasis on skills. Studies were made of the equipment used for testing and quality control, and the department's relationships with other principle divisions.

Change Concepts—The outstanding saving came from a revision of organizational concept. Engineering groups had been formed on a product line basis with full complements of engineers, designers, draftsmen, schedulers, clerks, and so on. Each product line group had complete autonomy in deciding on, and evaluating its projects.

The department setup was revised and headed by a centralized control group which screened projects; estimated the budget based on man-hour requirements; scheduled work both in the engineering department and in the plant; decided when machinery was required; analyzed "make or buy" for parts, assembled cost and times records; and coordinated the entire operation.

Annual savings of $197,000 were realized in the engineering department by organizational revision, elimination of poorly evaluated projects, and minor changes.

Maintenance

In a large steel plant, with a volume of $120 to $150-million annually, a study of the service departments was conducted to lower costs. The functions of the three hundred and ten employees in the janitor services, including the yard, paint, window, and waste disposal departments were analyzed. The survey disclosed that each employee who was assigned to his task by building, rather than by task, had multiple duties. Each building superior operated on an independent basis, setting his own work and quality standards.

Centralize Functions—To establish basic, uniform standards of performance, maintenance personnel were centralized under one organizational department head, and the service department was set up on a group basis. Centralized control facilitated the assignment of modern, high speed equipment to areas where the need was greatest.

Work areas were analyzed and uniform time standards were established based on specified quality levels. A performance schedule was set up, designating frequency of certain duties: cleaning, waxing, painting of floors, upkeep of machines, and maintenance of walls and windows. This routine was spelled out for crews and supervisors, regular inspections were made and records kept of the results.

Savings amounted to $120,000 a year.

These case histories based on actual company experience show only a few examples of how savings can be made.

Worth the Effort—But an alert management, by carefully probing its operations, can find many similar cases in its own plants.

The results will be well worth the effort. As competition becomes more intense, a good cost control system may mean the difference between a profit or loss on many a firm's balance sheet.

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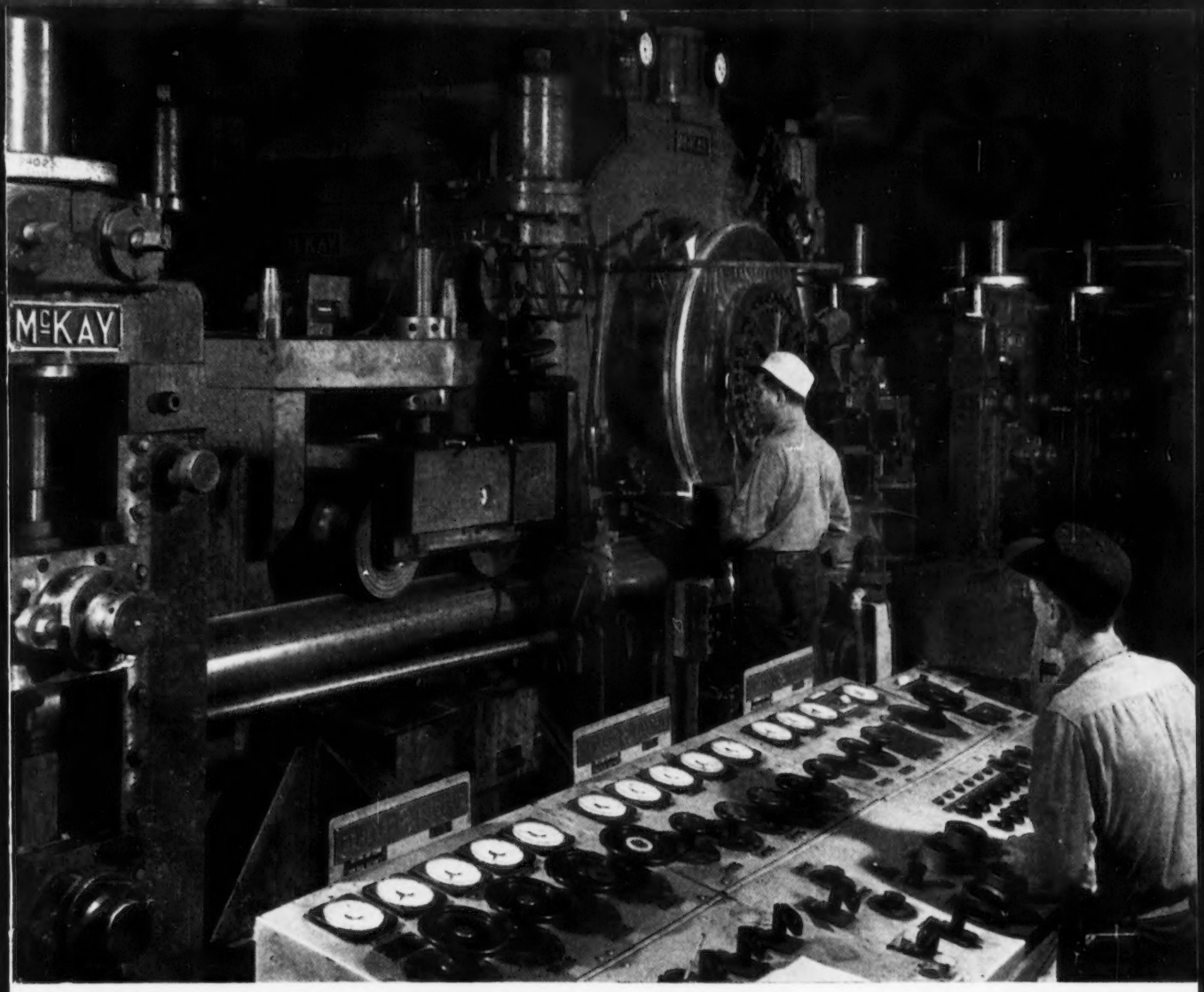


Advanced Design McKay Mill Sets Pipe Production Records At J&L

New era in pipe production comes of age as McKay incorporates oil cooled transformer, continuous visual recording of weld pressure and induction seam annealing, automatic control of weld speed and heat and synchronization of cut-off in large resistance weld pipe mill.

RECENTLY Jones & Laughlin Steel Corporation set into operation their new McKay Pipe Mill capable of producing 150 feet of 12¾" OD electricweld pipe every minute. More important than the speed, according to J & L officials, is the quality of the product. McKay's forced oil cooled transformer assures more pipe per kilowatt hour. It is the first 2400V transformer designed for continuous operation at frequencies up to 180 cycles.

Hydraulic load cells measure forging and electrode pressures at the weld zone. Weld speed and heat are controlled with precision to assure the most uniform welds possible at any speed with no readjustment necessary. Continuous seam annealing assures uniform ductility of pipe, and for the first time a synchronized cut-off has been successfully adapted to a large mill. The mill has several other advanced innovations applied to a line this size for the first time. To get all the facts talk with a McKay engineer soon.

McK

THE McKAY MACHINE COMPANY
YOUNGSTOWN, OHIO

No. 363

"X" Frame a Break for Designers

Three General Motors Divisions Are Using It

Some of the better strength concepts of the unit body are borrowed by the X-frame.

Designers praise its torsional rigidity, passenger compartment clearance.—By H. R. Neal.

■ An automobile's frame is its backbone. As such it has also been the source of headaches to automakers for a long time. It's always getting in the way or stopping somebody from doing something else.

Chassis engineers run afoul of the frame when they want to route pipes and shafts and tubes from one place to another. The body engineers build around its awkward shape. The stylists suffer through restrictions it places on their work, particularly in lowering a car.

Cadillac Was First — However, a new frame has gone a long way towards restoring compatibility to the team that designs cars for one automaker. It may not be the ultimate answer but those using it agree it's nice to have around until something better comes along.

Surprisingly enough the wasp-waisted X-frame introduced by Cadillac for 1957 model cars and now used by Chevrolet and Pontiac has greater torsional rigidity than previously used designs, according to N. H. McCuen, staff engineer for Chevrolet. The design is also flexible enough to permit changing wheelbases with a minimum of modification.

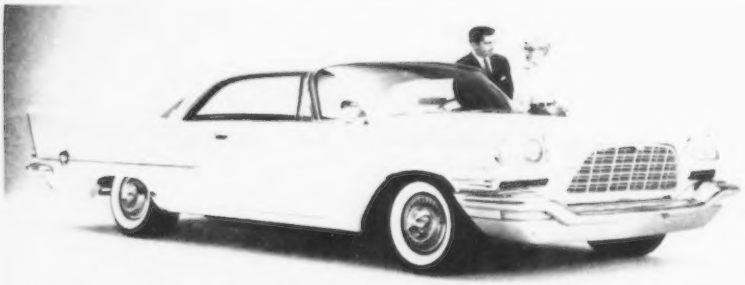
Advantages Add Up — In appearance it resembles a conventional rectangular frame whose side-members are brought together at the middle to form an unusually husky box-section member. It looks like a huge X. With the new design, torsional or twisting stresses imposed on the frame are effectively resisted by the central box-section member. Because of its location just ahead of the rear wheel kickup, a larger than normal cross-section could be used without interfering with the passenger compartment.

It combines a tunnel and support for the center section of the drive shaft. The sum total of these features also gives it the strength necessary to avoid bending in the middle like a swayback horse.

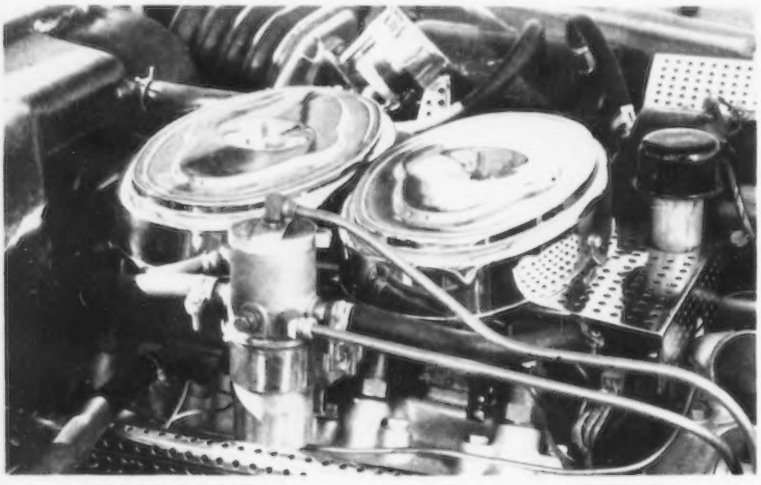
Special Functions — Of course Mr. McCuen said an important contribution of this design is what it does for the passenger compartment. It permits large areas of the underbody to be nested below the tops of the frame members, avoiding loss of leg room.

Mr. McCuen explained the excel-

Chrysler's Answer to Driving Pleasure

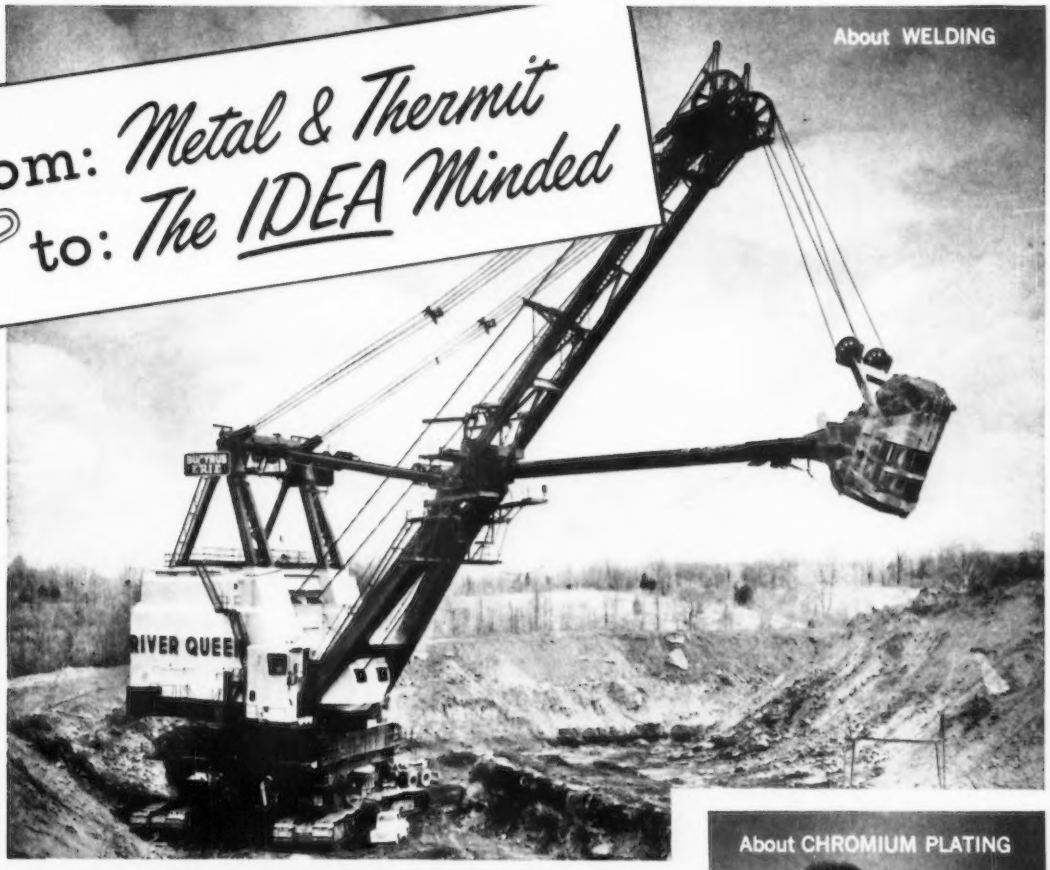


CHRYSLER 300D: Newest member of the 1958 Chrysler line is a sport-type prestige car featuring a 390 hp engine and a bubble windshield.



FUEL INJECTION: This electronic system is optional equipment on the 300D. It offers fuel economy, instant cold-weather starting, no warm-up

from: Metal & Thermit to: The IDEA Minded



Taking a big bite out of costs

Built by Bucyrus-Erie, this mammoth all welded shovel makes shorter work out of coal stripping operations. In one bite, it scoops an 80 ton load into its 14 x 12 x 9 foot bucket . . . bigger than an average room. The shovel stands 13 stories high, weighs more than 4,000,000 pounds . . . and is built for long, trouble-free service with strong welded connections.

Metal & Thermit's "Murex" electrodes were selected for many applications on this big welding job. These versatile, easily handled electrodes are used throughout industry wherever strong and reliable welds with good impact qualities are needed.

Jobs for plastisols become bigger . . . and still BIGGER

Interior of this large fume scrubber was *sprayed* with Unichrome Plastisol by Kaybar, Inc., Birmingham, Mich. The thick vinyl coating withstands abrasion, acids, alkalies, and many other corrosives. Being pore-free and seamless, the Unichrome Plastisol lining is now preferred for many jobs where rubber or plastic sheet linings were used formerly.

Note that sheer size is no longer a hindrance in applying plastisols. Firms like Kaybar with ever-expanding facilities are located at key points and can handle *your* big jobs, too.

Key performance in typing

Every buyer of an IBM Electric Typewriter knows how easily and economically it operates. Little do they know, however, of the many quality details that go into its construction for extra dependability.

Trip levers, for instance—vital links between key and letter—are chromium plated for increased resistance to wear and corrosion. Unichrome SRHS™ Chromium is plated from a Unichrome Continuous Chromium Plating Barrel which assures complete coverage of parts, large output and economical operation.

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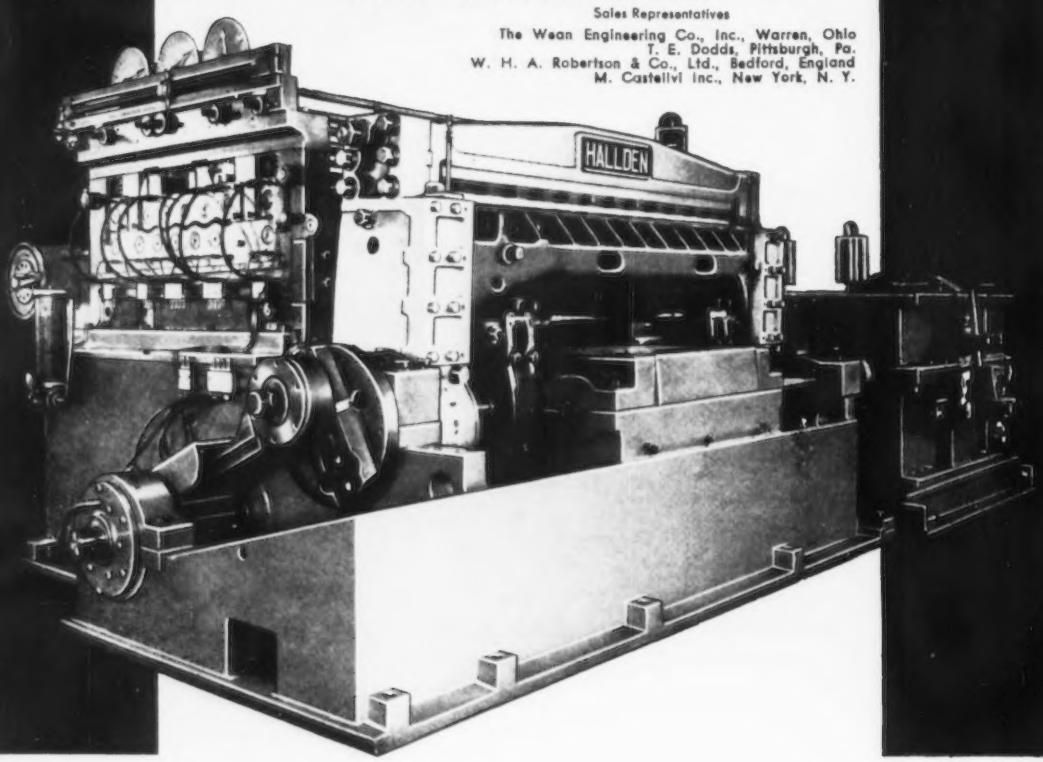


Automotive Production

WEEK ENDING	CARS	TRUCKS
Dec. 7, 1957	143,064	22,534
Nov. 30, 1957	114,795	17,312
Dec. 8 1956	167,576	24,091
Dec. 1, 1956	159,976	25,062
TO DATE 1957	5,725,000	1,160,000
TO DATE 1956	5,372,000	1,046,000

* Preliminary Source: Ward's Reports

lent structural properties of the X-frame are provided largely through a specialization of function of the individual members. For example he said the X-frame offers greater resistance to road shocks than the previous rectangular design.

When one wheel of a vehicle passes over an obstacle a vertical shock is given to the adjacent corner of the frame. This twists the frame, raising one corner and lowering the other. The X-frame bends, localizing the reaction with less deflection being transmitted to other frame components or the body.

Integrated Design—The question naturally arises, where does the body get support formerly coming from the side rails?

Mr. McCuen agreed a conventional automobile body would lack sufficient strength to satisfactorily resist torsional forces or withstand side-on collisions. But Chevrolet's new body and frame were designed as an integrated unit.

While this approach to frame-body integration is definitely not unitized construction it has grabbed off some of its better strength concepts. At the same time it has kept the flexibility offered by frame and body construction methods and this has been accomplished with existing facilities.

November Auto Output Is Higher

November automobile production climbed to 578,601 passenger cars—the highest monthly output since January's total of 642,094. In the same month last year, the five automakers built 581,078 cars. This raised the number of passenger cars built in the first 11 months of 1957 to 5,580,850 compared with 5,198,062 units for the same period in 1956.

General Motors accounted for over half of the nation's output with 297,004 units. Ford Motor Co. production in November totaled 170,798 including 2483 Edsels.

AMC Shows Gain — Chrysler Corp. production totaled 91,197 for the month. American Motors turned out 12,966 Ramblers, almost double the number produced in November, 1956. Studebaker - Packard Corp. produced 6636 cars last month.

Auto Probe Postponed

Senate Antitrust subcommittee's public hearings on wage-price policies in the auto industry, showing signs of blooming into a lengthy investigation, are now postponed to Jan. 28.

The hearings, originally scheduled for Dec. 16, are being delayed because the planned one day or so now appears likely to stretch closer to a week, and because the subcommittee staff wanted more time to collect information. There is also the fear that they would have to take a back seat to the more sensational missile probe of the Senate Preparedness subcommittee, scheduled to resume Dec. 13.

Invitations Unanswered — The Antitrust subcommittee, headed by Sen. Estes Kefauver, D., Tenn., has not yet received word whether the presidents of the big three auto producers will appear personally. They are all invited.

The auto investigation is part of the subcommittee's probe of so-called "administered price" industry, which started last summer with the steel industry.

Ban on Backup Lights

Two states have decided dual backup lights are illegal under Uniform Vehicle Code regulations. Pennsylvania has ruled that models with four backup lights will not pass inspection. It specified the 1958 Olds and Ford Thunderbird. South Carolina agrees but is postponing enforcement pending a study.

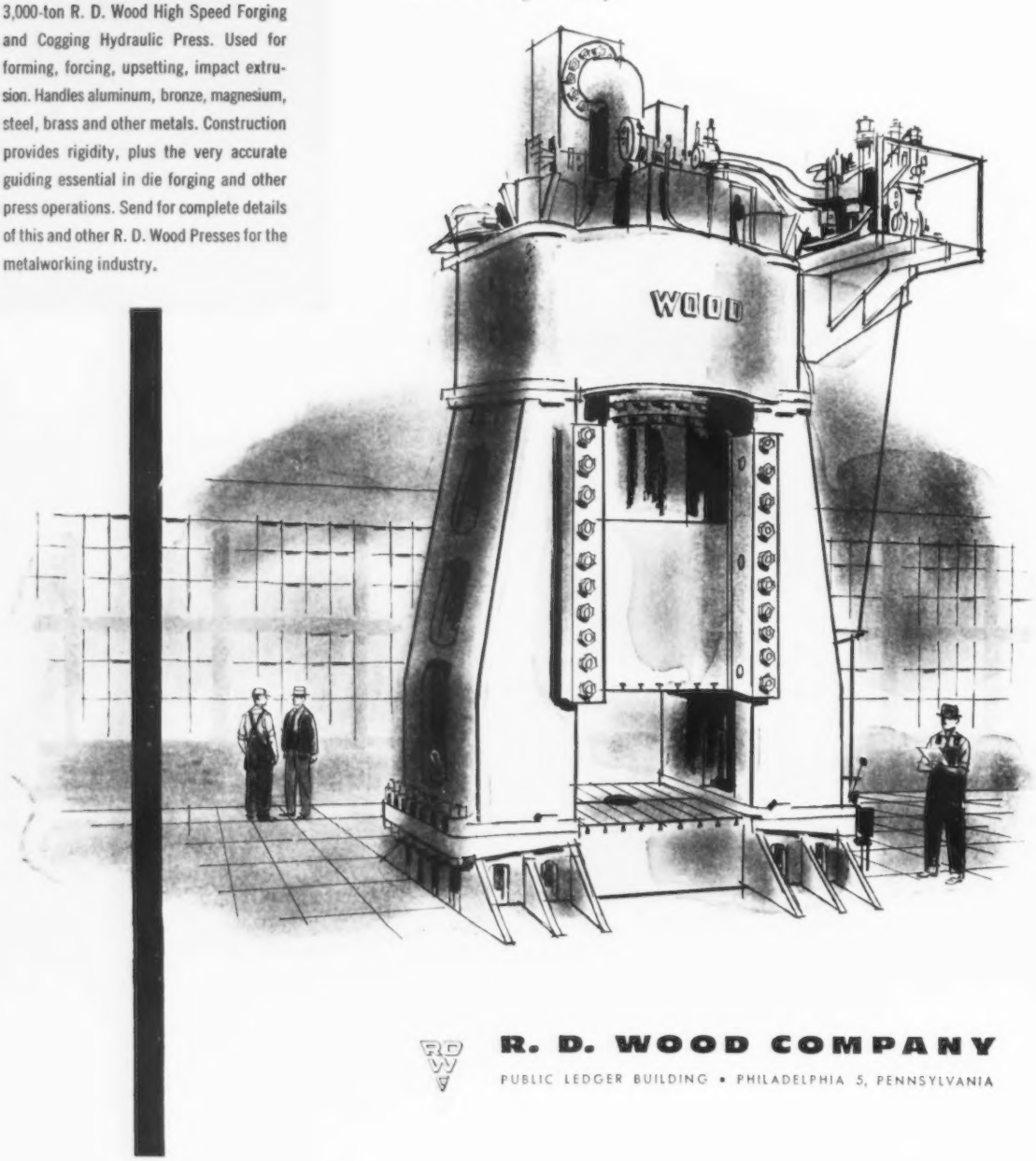
THE BULL OF THE WOODS

WHAT'S TH' SHOW ?
JUST WATCHIN' FOR ONE O'THEM BIG HOT CHIPS T'POP DOWN THAT BIRD'S NECK!
YES, STICK AROUND AN' WATCH TH' ACROBATICS! THERE GOES A BULL'S-EYE-- NOPE--NOW WATCH-- THERE-- NOPE-
"MAN'S INHUMANITY TO MAN"

3,000-ton R. D. Wood High Speed Forging and Cogging Hydraulic Press. Used for forming, forcing, upsetting, impact extrusion. Handles aluminum, bronze, magnesium, steel, brass and other metals. Construction provides rigidity, plus the very accurate guiding essential in die forging and other press operations. Send for complete details of this and other R. D. Wood Presses for the metalworking industry.

The most productive plants use R. D. Wood Presses

For proof, look at production records—and downtime for maintenance. Then watch an R. D. Wood Press at work. See for yourself the smooth, precise operation—the dependable performance—even under tough conditions. Finally, inspect an R. D. Wood Press up close. Notice the soundness of design, the excellence of materials, the scrupulous care given to each detail of construction. These are the reasons why R. D. Wood Presses have been the standard of excellence throughout the metalworking industry.



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It Looks Like a Record Budget

Cuts in Non-Defense Activities are Unlikely

In theory, it's possible for Congress to cut some spending to make up for increased defense expenditures.

In practice, it's tougher to cut than it is to raise taxes or go into another period of red ink. —By G. H. Baker.

▪ More and more, it's beginning to look like the 1958 session of Congress will vote the biggest-ever peacetime U. S. government. An all-time record budget (not counting war years) is in the making, and next year's election-minded Congress will stamp approval on most of it. The lawmakers may even add a few spending projects of their own.

Tax reduction is out of the window, of course; and a return to a red-ink budget is likely if overall government spending continues to rise.

Reluctant Congressmen — President Eisenhower, in his urgent plea for new and expanded federal science programs (Oklahoma City, Nov. 13), called for fresh spending for missile-and-rocket research, coupled with cancellation of low-priority government spending projects. But what congressman, in the supercharged atmosphere of an election year, will wipe out government jobs?

Theoretically, if Congress would close out enough non-essential programs to balance out the upcoming increase in missile-and-rocket spending, a balanced budget could be achieved and there might even be a surplus left over for tax reduction. But this situation is not likely to occur.

Cries of Outrage — Mr. Eisenhower warns that "the pressure groups will howl" over all proposals to cut federal spending programs. He never spoke a truer word. Already, sensitive bureaucrats in low-pressure agencies, plus Washington lawyers and lobbyists, plus quite a few individual congressmen are howling—and loudly. Give a listen:

The farm bloc is demanding that economizers stop eyeing crop subsidies as a place to save money.

Veterans' organizations (American Legion is the loudest) are protesting moves to trim veteran aid.

Natural resources spokesmen say they fear "deep slashes" are planned by the Budget Bureau.

Foreign aid officials are determined to prevent the erosion of any of their programs.

Loans and other forms of aid for small business will be vigorously defended.

Chances are there won't be any reductions that amount to anything.

The Defense Department is making it clear that it expects to receive at least $1.5 billion to $2 billion more than it received this year.

Executive Duty Worries Congress

Who's In Charge—Congressmen of both parties are demanding a new Federal law to spell out who shall take charge of the government when a President is temporarily or partially disabled.

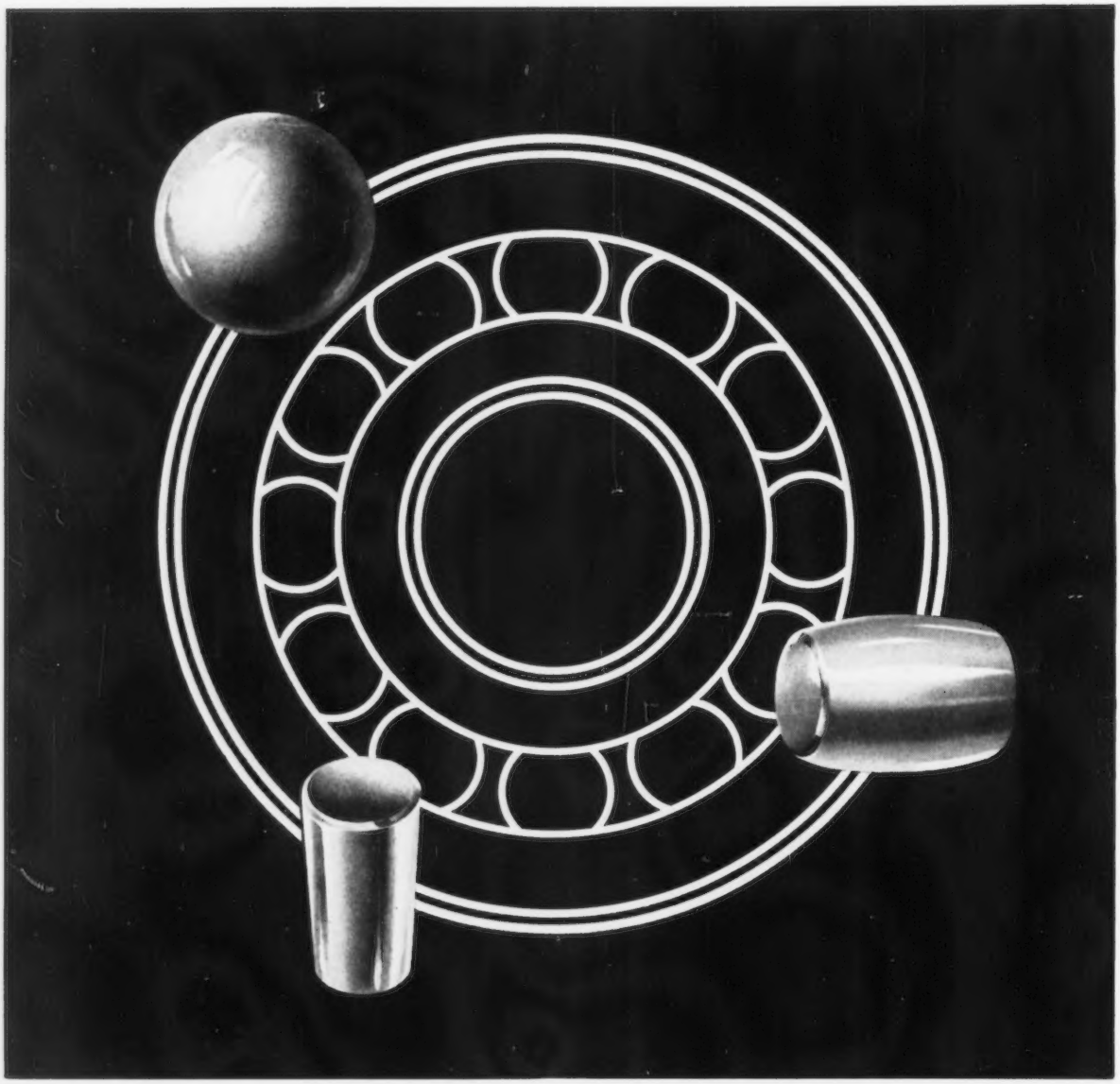
But of more immediate interest is the act of making executive decisions. It is this area that's causing so many furrowed brows around the corridors of the Capitol.

Adams Is the Man—Particularly controversial is the role of Presidential assistant Sherman Adams. He now is the key man in deciding what problems are important enough to put before the recuperating President.

Mr. Adams is reported to hold more power than has ever been delegated by a U. S. president, and is frequently charged with shielding Ike from facts of government.

Law Needed—What also bothers a growing list of congressmen is this: Who, if anyone, can act for a president when the chief executive is temporarily out of action? Certain legal responsibilities cannot be delegated. The President must sign bills, treaties, commissions and literally thousands of documents.

Sherman Adams



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Shipyards Seek Non-Marine Jobs

Hope to End Feast or Famine Cycles

Diversification looks good to the shipbuilders along the West Coast.

Expansion into other lines of work regarded as only solution to industry's chronic ups and downs.—By R. R. Kay.

■ Can diversification bring an end to feast or famine in West Coast private shipyards? A few yards are already trying it. And while others gear up for a whack at it, the idea gets thumping support from public officials.

Work Force Varies—Washington's State Employment Security Dept. sees private shipyard expansion into other types of industrial work as the only solution to the chronic ups and downs. And these ups and downs are drastic. Commercial shipbuilding employment of 2000 in 1940 jumped to 117,600 by 1943. It shrunk to 2100 by 1950. The Korean War pushed the figure to 5200. Today it's down to 4500.

More Shipwork Due—Right now, the private yards have a healthy amount of Navy work. But that doesn't change the basic picture in a battle for survival. Some $107 million in active contracts is held by four companies in the Pacific Northwest: Puget Sound Bridge and Dredging Co. and Todd Shipyards, both at Seattle; Bellingham (Wash.) Shipyards Co.; and Tacoma (Wash.) Boatbuilding Co.

There's a better-than-even chance that the yards on the Coast will get a good share of the Federal Maritime Board's 17 shipbuilding contracts soon to be awarded. American President Lines, San Francisco, is in for two vessels. Bethlehem Pacific Shipbuilding Corp. is one of the low bidders for a $22 million bulk carrier.

Kaiser Steel Delivers Knockout to Smoke

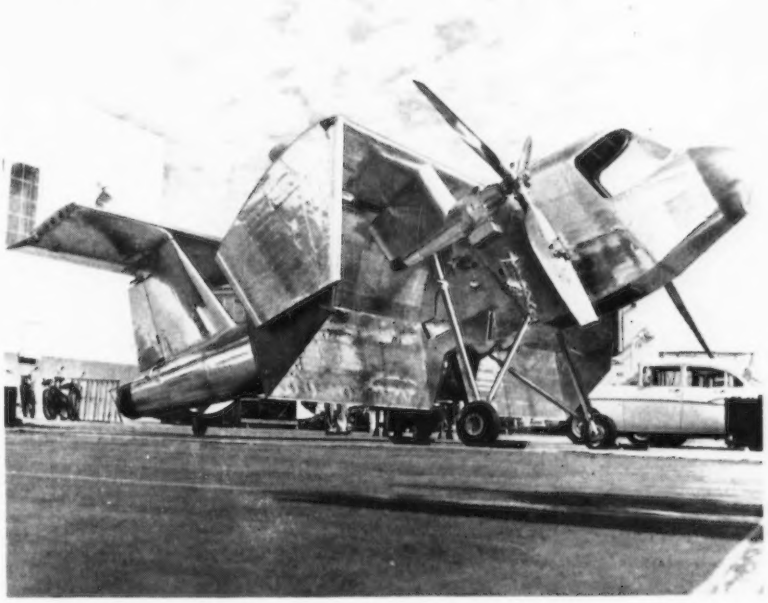
Smoke control at Kaiser Steel's Fontana (Calif.) plant has had a top priority since the plant opened in 1942. To date, the company has put up $8.5 million to lick the air pollution problem.

Kaiser has just finished installing electrostatic precipitators on all its nine openhearths. They remove smoke particles from furnace exhausts.

Charged Out—Here's how the electrostatic precipitator works: it's mounted on the roof of the openhearth building. The exhaust coming from a furnace is first cooled from 1700° F down to about 500° F in waste heat boilers. It's then blown up a 70 ft duct into the precipitator which has two 40 x 20 x 20 ft. chambers.

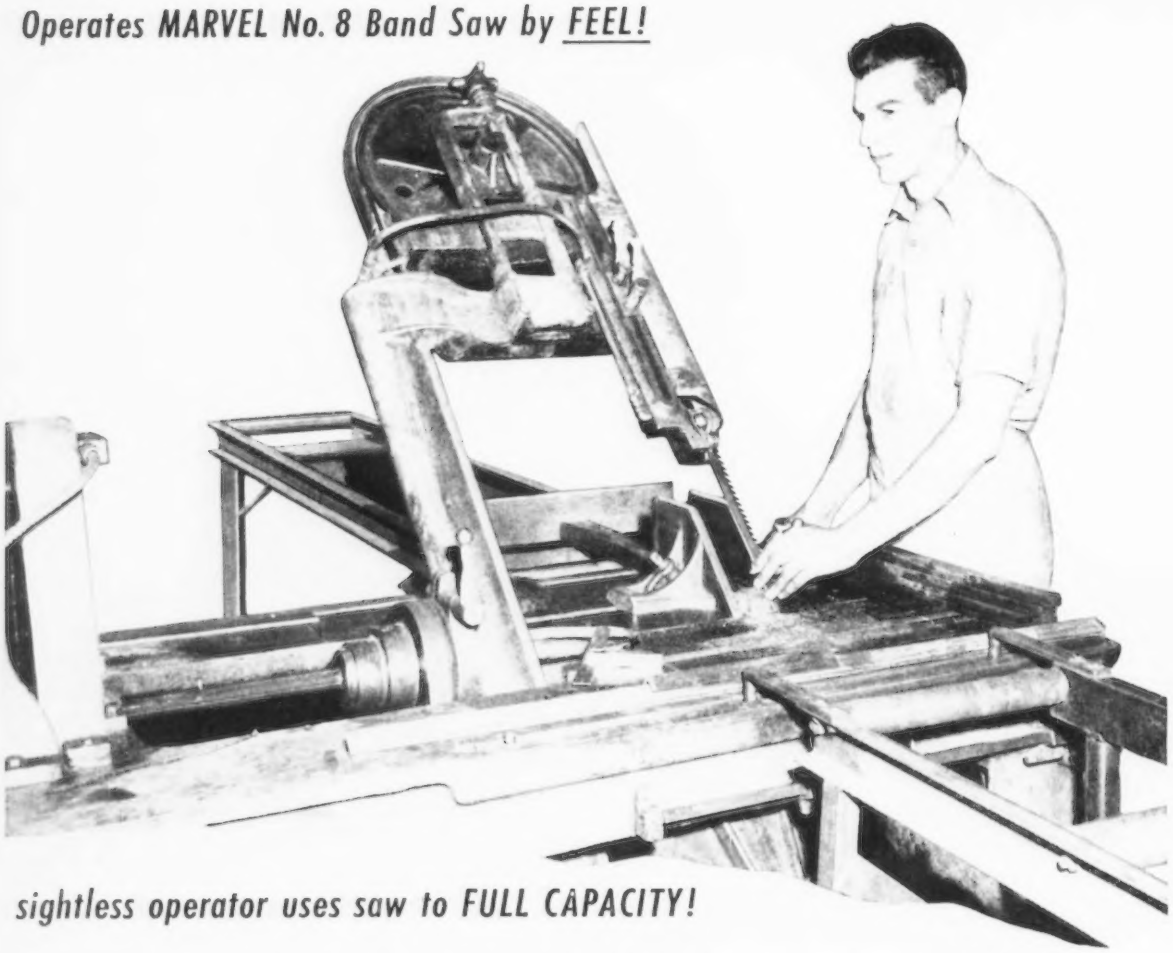
Inside these are a number of steel rods and "curtains." When the smoke particles enter the chamber, they get an electrical charge. They're immediately attracted to the curtain, which carries an opposite charge. Once collected on the curtains, they're shaken off into hoppers for removal.

Rough Going Will Never Be a Challenge



AERIAL YO-YO: Ryan Vertiplane, built for the U. S. Army, can take off and land vertically, hover and fly in horizontal attitude. Gas-turbine powered, it's able to operate from rough terrain without runways.

Operates MARVEL No. 8 Band Saw by FEEL!



sightless operator uses saw to FULL CAPACITY!

Among the many advantages of the MARVEL No. 8 Band Saw is the simplicity and convenience of operation built into this universal metal cutting saw.

Here's a case in point. Paul Stevens, who is totally blind, is employed by the Purkett Manufacturing Co., Joplin, Mo., manufacturers of laundry equipment, as a MARVEL No. 8 Band Saw operator. He operates two MARVEL No. 8 Band Saws, filling orders from the fabricating department for bars, shapes and even mitres. He handles the entire operation without assistance from anyone.

Thoroughly familiar with his stock and bin locations, he sets up the saw, measures lengths, and turns out work accurate to $\frac{1}{32}$". Almost any conceivable sawing job is handled on these machines, from the smallest, most delicate work to heavy beams, up to 18". They will cut-off bar stock, pipe, tubing, moulding and structural shapes—saving hours of machining time.

The MARVEL No. 8 vertical column design, table height working surface, easy accessibility to simple operating controls, fast and positive power or manual feed control, column and blade tilting to any angle up to 45° right or left of vertical for cutting at an angle or mitre—are just a few design and operating features that make MARVEL No. 8 Band Saws the best all-around saw you can buy.

For the complete story, write for the new Bulletin 875, which illustrates and describes this outstanding universal metal cutting saw.

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MARVEL *Metal Cutting* SAWS
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Drive to Educate Public Begins

Too Few Know the Importance of Machine Tools

Industry group hopes motion pictures will help stir interest among young people.

British note similar situation. Reds may be ahead in this field, too.—By E. J. Egan, Jr.

■ By and large, the American public seems to have little or no understanding of what machine tools are, what they do, and how essential they are to the nation's defense and economy.

The National Machine Tool Builders' Assn. hopes to correct this situation with a motion picture designed to tell even the greenest audience what these tools are all about. NMTBA members voted overwhelming approval of the movie plan at their last annual meeting.

John Bull, Too — Now comes word that the average Briton is as blank about machine tools as any U. S. John Doe. An editorial in the British magazine, Engineering, recently deplored the same situation in that country. At the same time, the writer admitted that this was still another area where the Russians appear to excel.

"Schoolboys are taught to know the date of Queen Anne's death," the editorial says, "but not the way that mother's saucepans or the cylinder blocks of father's car are made. It may have serious consequences for a country that looks to schoolboys for its future engineers."

Little Known Facts—Continuing, the writer remarks that, "Most schoolboys know the difference between a Vauxhall and a Morris, a Viscount and a Convair; but how much more prestige might attach to the boy who knows a shaper from a planer. Obscure knowledge has a peculiar attraction of its own."

The editorial laments the fact that there is no special technical and scientific journal published in Britain for young people. In contrast, it cites a recent issue of the Russian magazine, Yuni Tekhnik (Young Technician).

Atoms to Drill Bits—It has, the English writer notes, "well laid out and colorful sections not only on particle accelerators—showing the difference between synchrotrons, cyclotrons and Van de Graaf machines—but also on the construction and operation of drilling machines."

Summing up, the editorial makes the point that machine tools—and all other aspects of engineering—are "exciting." The writer thinks it curious that this excitement has not been encouraged. With a typical British flair for understatement he gives his reason: "A youthful interest in engineering may prove a national asset."

Letting American youth "in on the know" is one purpose of the proposed NMTBA movie. Firms in the industry hope that young men who see it will view the field as an attractive career opportunity.

Gear Production Bounces Back

Bookings in the gear industry bounced back in October after September's low point for the year to date. The October index is up 18.5 pct over the September mark.

Source: American Gear Manufacturers Assn.

INDUSTRIAL BRIEFS

Shedding Some Parts — Chase Brass & Co. has sold the entire Cold Heading Dept. of the Waterbury Mfg. Co. Div. to the Connecticut Screw & Rivet Co., Waterbury, Conn., and its affiliate company, Anchor Fastener, Inc., with plants at Waterbury and Cleveland. Purchase includes facilities, such as dies, tools, prints and other information necessary to the production of cold-headed products formerly made by the Chase Div. Operations at the Chase Metal Works and the Chase Cleveland mills will continue in both locations.

Bonnie Site — Beckman Instruments, Inc., is building a $250,000 manufacturing plant at Glenrothes, Scotland. The plant is located near the Firth of Forth in the County of Fife and will be known as Beckman Instruments, Ltd. The company is expected to augment foreign sales by at least 20 pct during the next three years. Operations will begin in February and will manufacture precision potentiometers, components for electronic instruments and systems.

Ready to Market — Operations have begun in Fansteel Metallurgical Corp.'s $6.5 million tantalum-columbium plant at Muskogee, Okla. The facility is designed to produce tantalum and columbium metal powders and ingots by a series of chemical, electro-chemical and powder metallurgy processes, beginning with ores. The chemical processes are now in operation and ingot production is expected to get underway after Jan. 1.

Back to Work—The five-month strike at Climax Molybdenum Co.'s Langeloth, Pa., plant has been settled. An agreement has been concluded with Local No. 1311 of the UAW. Production of technical molybdic oxide is not anticipated prior to the first of the year. Ferro-molybdenum production will commence at a later date.

R and D — A new research and development subsidiary, to be called Townsend Engineered Products, Inc., has been formed by Townsend Company. The new firms, which will headquarter in Santa Ana, Calif., will be interested in equipment for the aircraft, automotive, petroleum, ordnance, transportation, and armament industries. Studies involving special metals, combat vehicles and human engineering will also be undertaken.

Congratulations — The 1958 recipient of the AIME Rand medal for distinguished achievement in mining administration will be Dr. John F. Thompson, Chairman of the Board of the International Nickel Co. of Canada. Dr. Thompson, who will receive the award next February in New York City, is being honored for "leadership of a mining and metallurgical enterprise which has contributed to free world strength, for administrative skills . . . furthering the progress of the nickel industry, and for his vision in stimulating scientific research."

Nice Setting—Handy and Harman, refiners and fabricators of precious metals, are completing a new plant at El Monte, Calif. The new 23,000-sq ft building is slated for opening in February of next year. At that time the company's present West Coast plant at Los Angeles will be closed. The new installation includes space for an office, laboratory, refinery, operating area and a warehouse. The laboratory is equipped for the precision analysis and weighing of gold, silver, platinum and other metals.

Indian Ore Trick—Hewitt-Robins, Inc., has received an order of more than $5.5 million for the construction of a material handling system. It will be for a new iron ore mine atop a 2600-ft mountain at Barsua, Orissa Province, India, 225 miles southwest of Calcutta. Order calls for design, fabrication and erection of a 2-mile conveyor system and related crushing, screening and storage facilities. It will carry ore from the mine, process it to specifications, then load it into railroad cars for shipment to the steel plant 45 miles away.

Citation—V. S. Lazzara, president of Casting Engineers of Chicago, was awarded the coveted "Whale Award" by The Investment Casting Institute. Award was for his "devotion to the Institute since its inception." Dr. R. A. Flinn of the University of Michigan was also honored for his liaison work between the Institute and the universities in the dissemination of educational information on the investment casting process.

Aid to Education—A program of financial assistance to privately endowed colleges and universities—inaugurated in 1953 by Bethlehem Steel Co.—has resulted in endowments of $1,302,000 for 61 institutions. That sum, Bethlehem president Arthur B. Homer states, is in addition to other amounts paid by the company to colleges and universities for research specifically requested or for direct benefit to the steel industry.

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Final contour is achieved by spraying the hemisphere again with 'dag' 41; then spinning under torch heating and wood tooling until the hemisphere assumes the shape of the spin block. Both hemisphere and spin block are coated with 'dag' 41 to facilitate removal.

'dag' 41 prevents galling, scoring and metal pickup; its ease of application, film strength, lubricity and resistance to heat make it the perfect deep-drawing lubricant. Talk with your Acheson Service Engineer soon, for more detailed information, and write for Bulletin 426—Metalworking Applications. Address Dept. IA-12.

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MEN IN METALWORKING

R. S. Newlin, elected vice president, operations, The Anaconda Co.; **T. A. Campbell,** elected vice president, Latin-American affairs.

Tad Stanwick, elected corporate vice president, Cleveland Pneumatic Tool Co., Cleveland.

P. H. Setzler, elected vice president, Manufacturing Dept., Boiler Div., The Babcock & Wilcox Co.

R. K. Heineman, elected vice president, Alton & Southern Railroad, subsidiary of Aluminum Co. of America.

R. W. Davison, appointed director, sales planning and coordination, Armco Steel Corp., Middletown, O.

H. M. Givens, named vice president, sales, Latrobe Steel Co., Latrobe, Pa.

D. E. Reichelderfer, elected vice president, finance, Armco Steel Corp., Middletown, O.

Dr. Glycon de Paiva Teixereira, elected vice president, Kaiser Aluminum International, Inc., and Kaiser Bauxite Overseas, Inc., subsidiaries of Kaiser Aluminum and Chemical Corp.

Raymond LaFrance, named vice president and treasurer, The Genetal Sheet Steel Co., Cleveland.

W. J. McGraw, appointed general sales manager, Thor Power Tool Co.'s sales and product operations; **W. G. Mitchell,** appointed general manager, product development; **M. E. Slater,** named sales manager, Farm and Ranch Div.

W. G. Dahl, appointed general sales manager, Latrobe Steel Co., Latrobe, Pa.

D. A. Stromsoe, named president and general manager, Southern Pipe & Casing Co., Azusa, Calif., Div. of U. S. Industries.

L. E. Long, appointed manager, San Francisco electrical sales branch, Wagner Electric Corp.

J. A. Bader, named district manager, sales, Republic Steel Corp.'s Culvert Div. in the Hammond, Ind., district sales office.

J. D. Harmison, appointed sales manager, material handling, Buda Div., Allis-Chalmers Mfg. Co.

L. V. Klaybor, appointed product manager, tool steel sales, Allegheny Ludlum Steel Corp., Pittsburgh; **P. R. Borneman,** named chief research metallurgist, tool and die steels.

T. G. Vickers, named plant manager, Ross Operating Valve Co., Detroit.

J. E. Workman, appointed executive vice president, Latrobe Steel Co., Latrobe, Pa.

A. L. Krasnow, appointed sales manager, Eastern region, Nuclear Systems Div., The Budd Co., Philadelphia.

R. P. Stuntz, appointed asst. sales manager, Refractories Div., The Babcock & Wilcox Co., New York.

H. G. Evans, appointed general manager, operations, Sharon Steel Corp., Sharon, Pa.; **A. G. Neese** and **C. W. Diven, Jr.,** appointed asst. general sales managers; **W. A.**

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Yun Jen, appointed specialist, General Electric's Chemical Materials Dept. product development section, Anaheim, Calif.

H. C. Oliver, appointed general superintendent, Fulton Sylphon Div., Robertshaw-Fulton Controls Co.

R. E. Sadler, appointed asst. sales manager, Tool Div., The Billings & Spencer Co., Hartford, Conn.

C. C. Rigsby, appointed general manager, Packard Electric Div. of General Motors.

A. F. R. Peterka, appointed manager, marketing service, Lamson & Sessions Co., Cleveland.

J. J. Witzig, Jr., promoted to manager, sales, Chicago district mill sales office, Detroit Steel Corp.

L. W. Darling, appointed general sales manager, Davey Compressor Co., Kent, O.

J. C. Bigham, Jr., appointed manager, stainless strip sales, Universal-Cyclops Steel Corp., Bridgeville, Pa.

D. H. Hartmann, appointed asst. general manager, The Moto-Mower Div., Detroit Harvester, Richmond, Ind.

R. W. Huysman, appointed manager, Chimney Div., The Rust Engineering Co., Pittsburgh.

J. R. Keates, appointed general sales manager, Machine Tool Div., National Automatic Tool Co., Inc., Richmond, Ind.

M. W. Hartman, named sales manager, Darcova Div., Darling Valve & Mfg. Co., Williamsport, Pa.

D. B. Williams, appointed general sales manager, Union Carbide Olefins Co., Div. of Union Carbide Corp.

A. P. Moss, appointed works manager, Union Carbide chemicals Co., Div. of Union Carbide Corp.

W. R. Magness, named director, Research and Technical Dept., Luria Brothers & Co., Inc.

J. S. Howard, becomes asst. secretary, Pittsburgh Steel Co.

B. M. Johnson, named general manager, Refractories Div., The Carborundum Co.; **R. A. Barr,** appointed asst. general manager,

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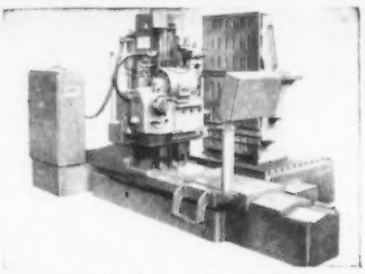

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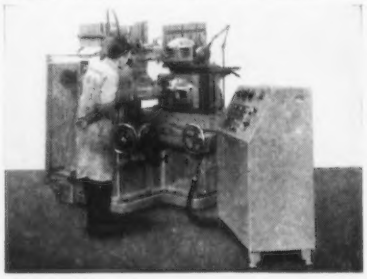

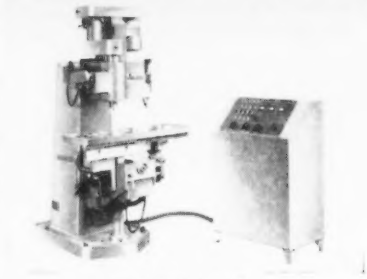

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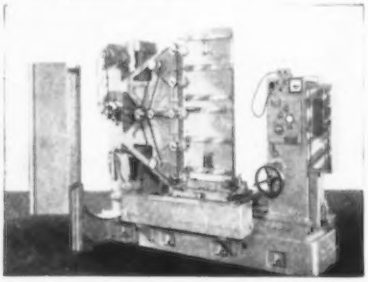

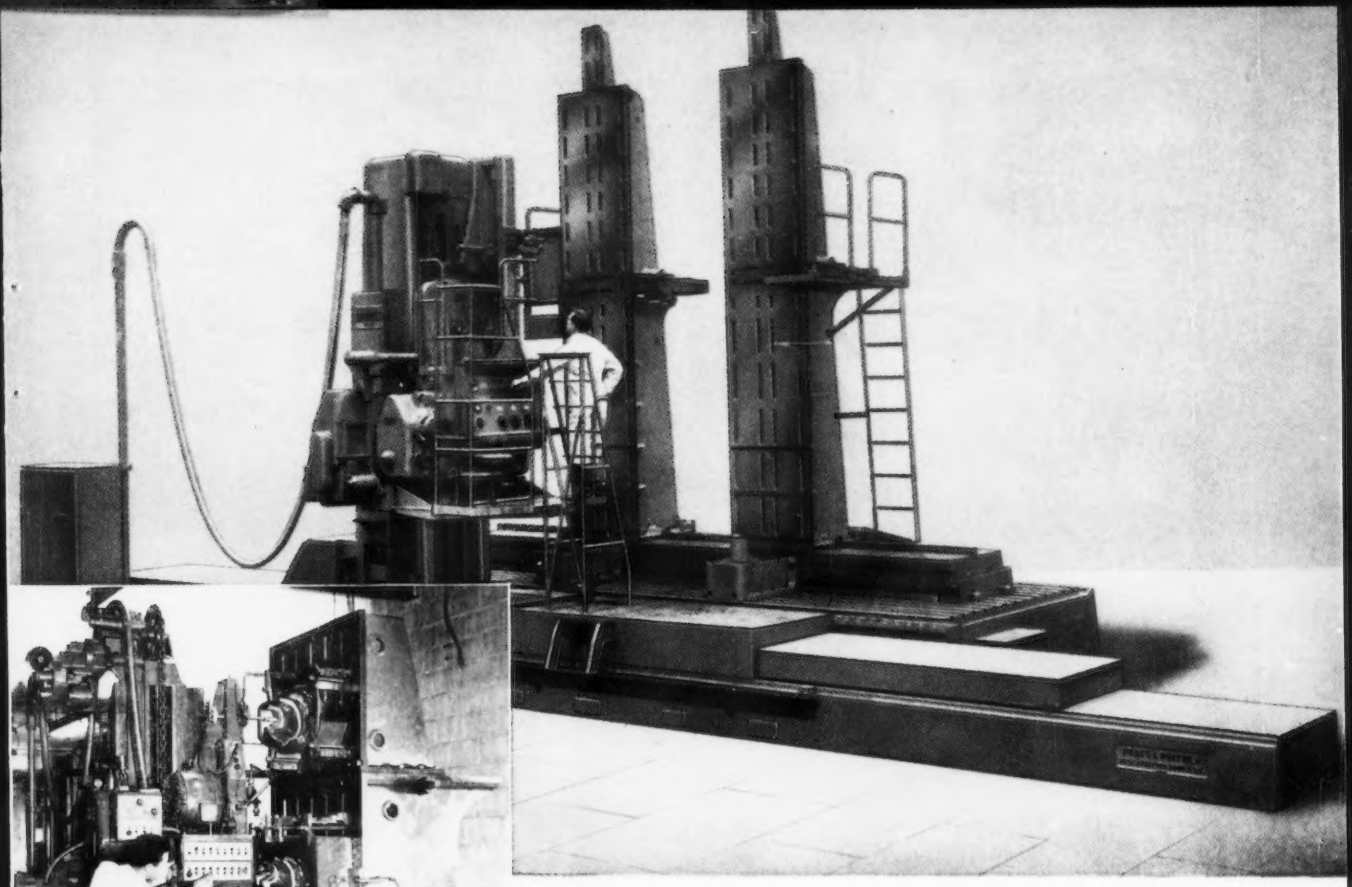

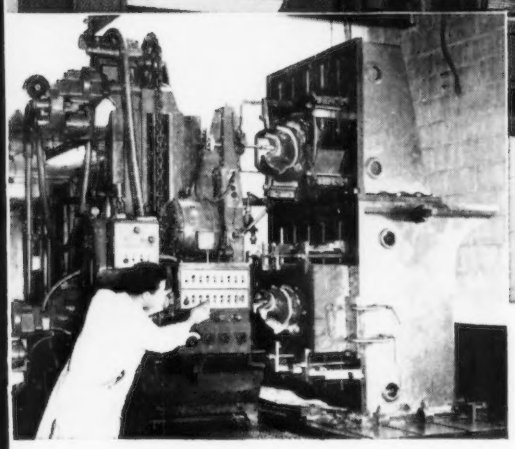

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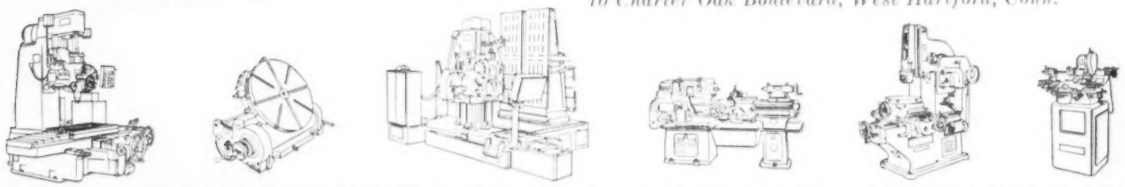

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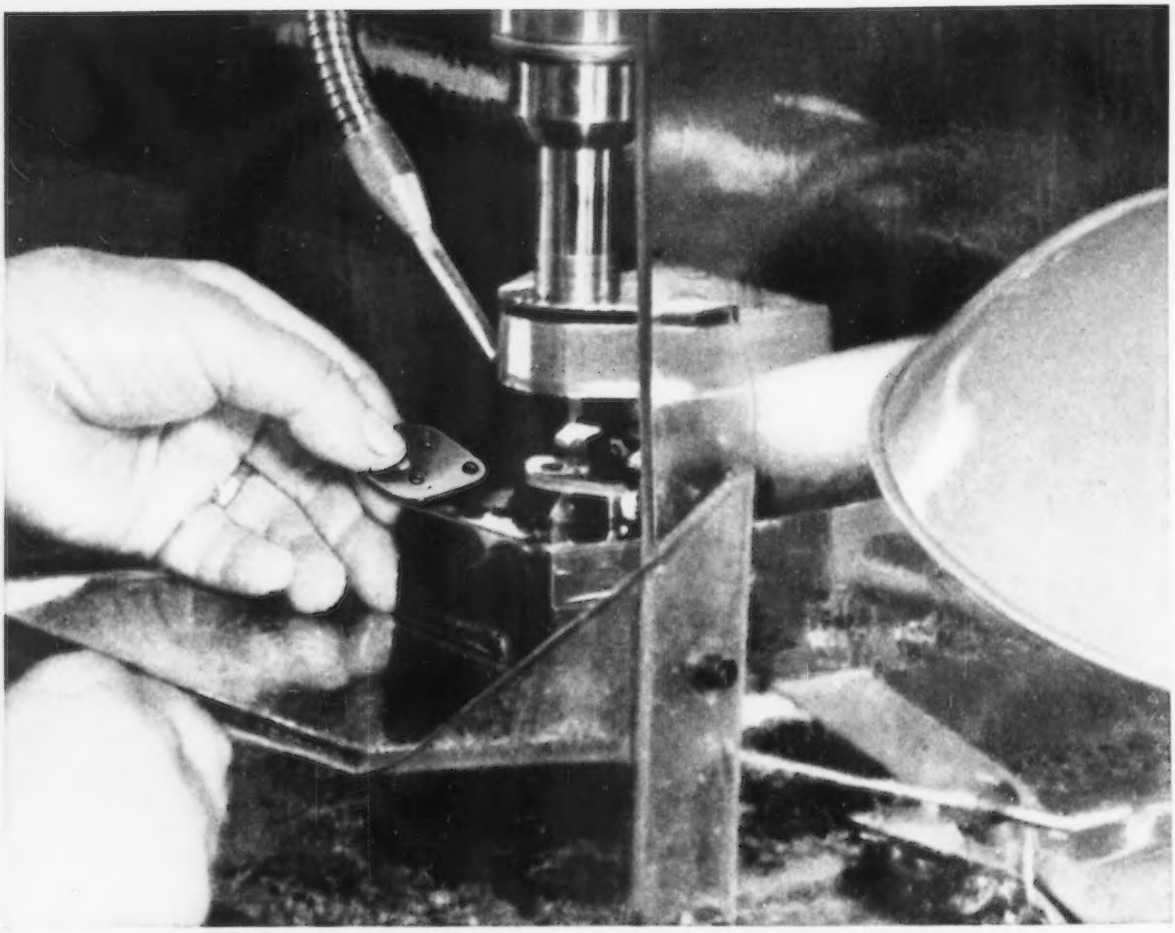

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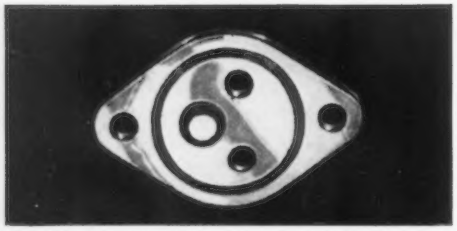

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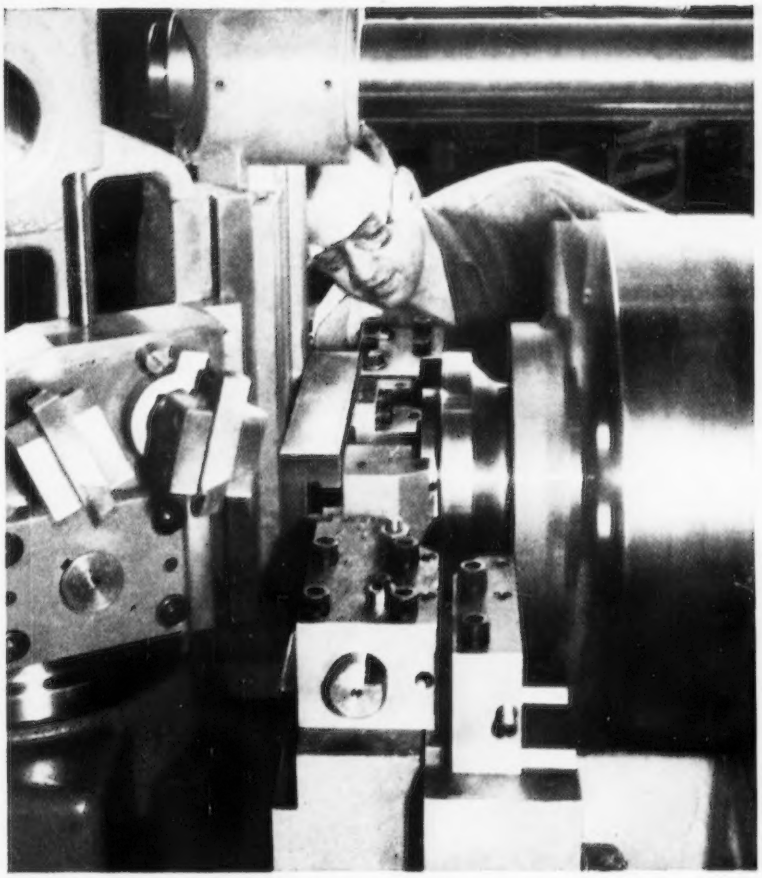
C. A. Brangham, appointed manager, Tin Plate Sales Div., Republic Steel Corp.

R. F. Hanson, named assistant to director, sales, materials handling equipment, Ingersoll Kalamazoo Div., Borg-Warner Corp.

J. M. Heldack, appointed manager, marketing, Aircraft Accessory Turbine Dept., Lynn, Mass., General Electric Co.

C. J. Lause, Jr., becomes director, commercial research, Commercial Research Dept., Jones & Laughlin Steel Corp.

E. T. Robinson, Jr., named general superintendent, Natural



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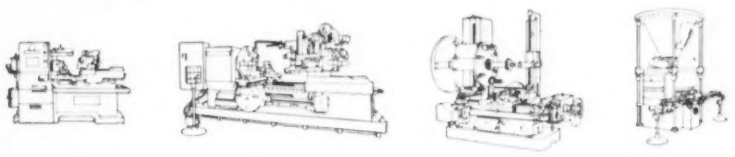

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W. H. Mutschler, appointed chief engineer, Allis-Chalmers Pittsburgh Works.

C. H. Hannan, appointed senior application engineer, Miniature Precision Bearings, Inc., Keene, N. H.

William Patterson, Jr., named preliminary design engineer, Aero Hydraulics Div., Vickers Inc.

R. C. McMillan, appointed chief engineer, Pershing Road plant, Chicago, Link-Belt Co.; **D. A. Davis,** appointed chief engineer, Caldwell plant, Chicago.

D. H. Montgomery, appointed senior supervisory development engineer, Transducer Div., Consolidated Electrodynamics Corp., Pasadena, Calif.

H. W. Read, elected vice president, planning and control, Alan Wood Steel Co., Conshohocken, Pa.

L. G. Campbell, elected controller, Alan Wood Steel Co., Conshohocken, Pa.

OBITUARIES

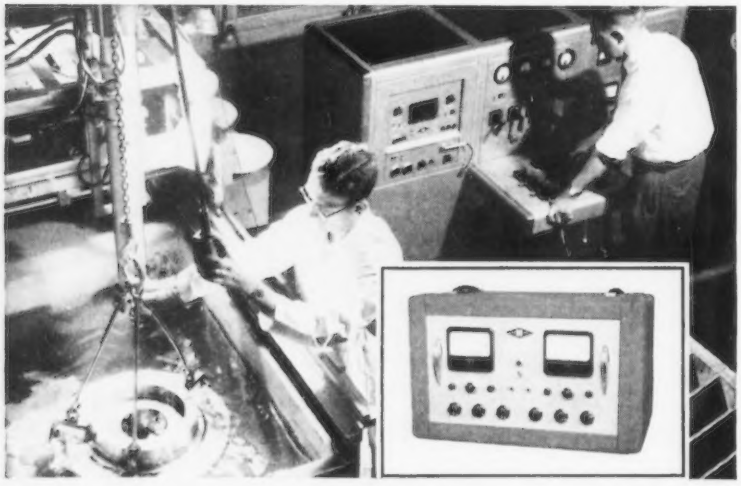
W. K. Stamets, 74, president and founder, Wm. K. Stamets Co. of Pittsburgh and Cleveland.

J. B. Parsons, 70, former president, Mayhew Steel Products, Inc.

E. C. Foster, 63, purchasing agent, Draper Corp. and former purchasing agent, Worcester Pressed Steel Co.

H. J. Kingsbury, 74, former chief engineer, Hammond Machinery Builders, Inc., Kalamazoo, Mich.

Cecil Farrow, 59, consulting engineer, Republic Steel Corp.'s electrical laboratories.



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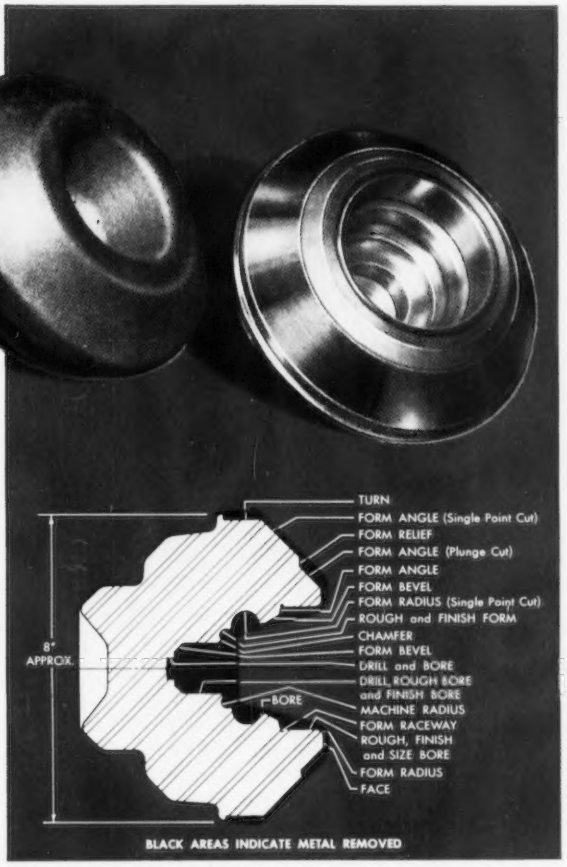

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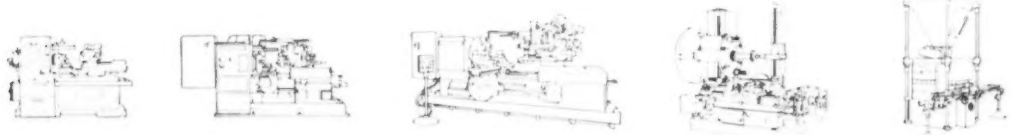

AUTOMATIC TURRET LATHES . . . GEAR CUTTERS . . . GILDA PACKAGING MACHINES

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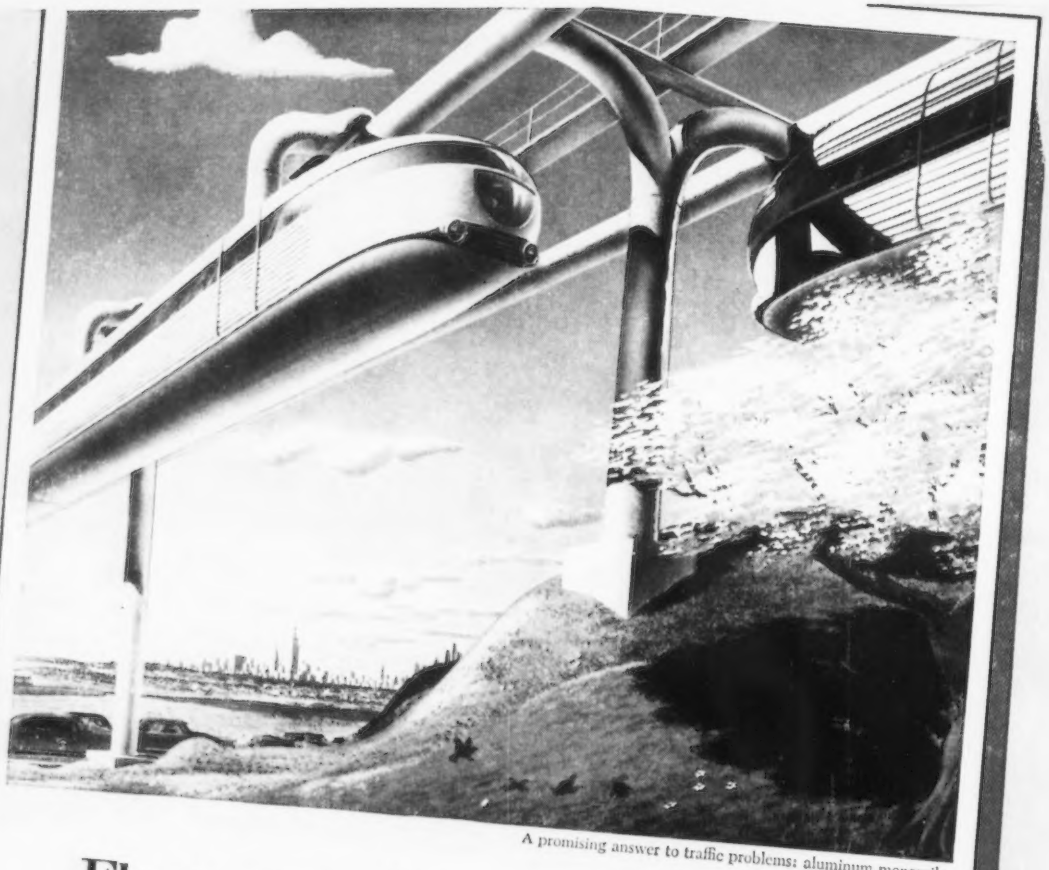

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Press-Form Metal Tubing With Simple Dies

By Federico Strasser—Consultant, Santiago, Chile

A press or a press brake, a supply of flat blanks and some simple dies are all you need to form metal tubing.

With a few tooling tricks you can switch from round to square tubes; from butt-jointed seams to the flanged type.

Here is what you need to know, in words and simple sketches.

■ Suitable press tooling is the key to mass production of short lengths of tubing from flat pieces of sheet metal. For die design not only determines how the tube seam is joined throughout its length, it also permits curving or bending flat blanks into a variety of cross sectional forms.

For example, seam closure may be only a matter of soldering or welding a butt joint formed in a simple die. In other cases, end use might dictate a closure of the overlapped, lockseamed, interlocked or flanged variety, Figs. 1 through 4; dies can be built to produce any of these.

Form Can Vary — Tube form, also, can vary from the straight cylinder to a tapered cylinder, or to cross sectional profiles that are either ovular, square or rectangular.

Press formed tubes are usually between 3/8 in. and 6 in. long, made from flat blanks that are between 0.02 and 0.08 in. thick. Blanks can be cut on squaring shears and fed to the forming die one at a time. For high-volume output, however, coiled strip material is often used. In this case, shearing is handled as a stage of the forming operation.

Three basic types of dies are used to form short lengths of tubing: Single forming dies; a series of simple forming dies; compound (multi-stage) dies.

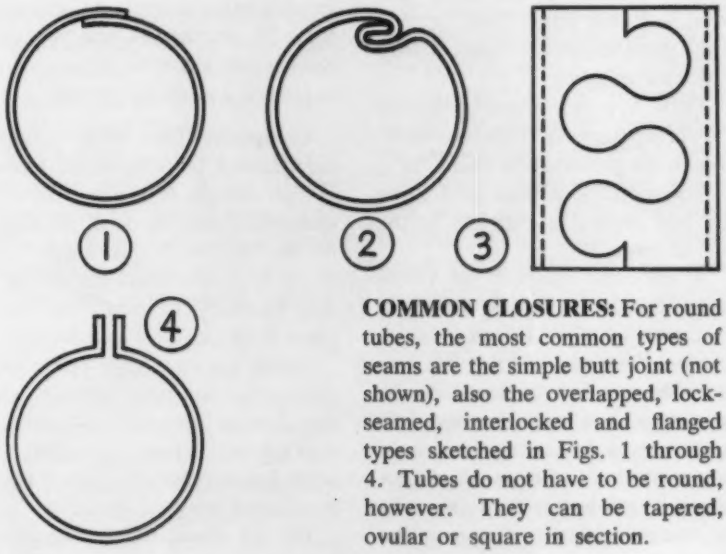
Single Die Types—Fig. 5 shows an inexpensive single tool composed of a female die, a punch and a mandrel. In operation, a flat blank and the mandrel are placed in the die cavity. As the punch descends the blank curves itself around the mandrel, following the half-round contours of the punch and die.

This tool has a few drawbacks: It can only be used on fairly strong blanks; tubes are hard to remove because of unavoidable stock-thickness variations and springback; the sharp edges of the punch are dulled rather quickly.

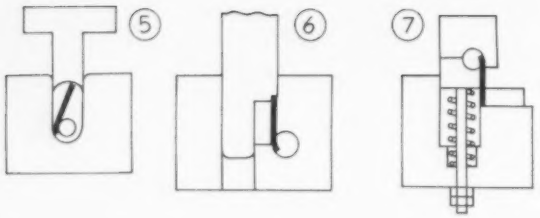
The simple tool shown in Fig. 6 has no sharp edges to dull or break, nor does it always need a mandrel. However, it's used only on relatively thin stock where there is danger of buckling.

The design of Fig. 7 uses a spring-actuated holder for the female die. This type of tool costs more, but it does permit the tube to be lifted out when the die is opened; there is no ejection problem.

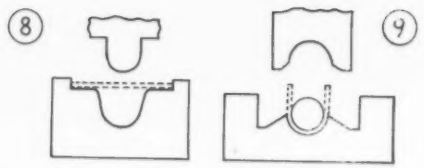
Curving the starting end of the blank slightly insures best results

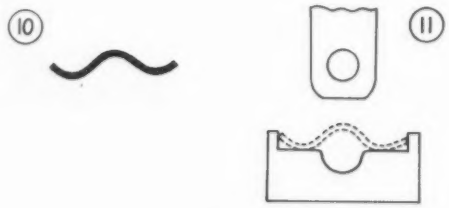


COMMON CLOSURES: For round tubes, the most common types of seams are the simple butt joint (not shown), also the overlapped, lockseamed, interlocked and flanged types sketched in Figs. 1 through 4. Tubes do not have to be round, however. They can be tapered, ovular or square in section.

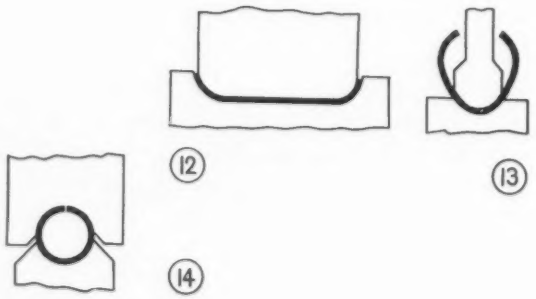


SINGLE DIE TYPES: Simplest, least expensive tube forming setup is the punch, mandrel and die of Fig. 5. Tool shown in Fig. 6 costs a bit more, but has no edges to dull, nor does it always need a mandrel. Still more costly, the tool of Fig. 7 permits lifting the formed tube out easily.





FOR LARGE DIAMETERS: At least two forming stages are needed: a preform, as in Fig. 8, and a final rounding, as in Fig. 9. Some shops prefer the two-stage technique shown in Figs. 10 and 11, where the mandrel is mounted in the press ram. Stronger metals, such as stainless steel, may require three forming operations, as sketched in Figs. 12 through 14.



in single-die tube forming. This may be done when thin stock (up to 0.04 in. thick) is sheared or blanked. Thicker stock requires a separate forming die.

Need Several Dies—Large diameter tubes cannot be formed in one stage, especially if the stock material is rather thin. Two, or possibly three stages are needed, with a die for each one.

There are two ways to handle the large-diameter tube problem. One is to preform the blank to a "U" shape (Fig. 8) and then curve the legs around a mandrel in the second stage, Fig. 9.

A preferred method for rather large tubes is to preform the blank as shown in Fig. 10 and finish it in a die as sketched in Fig. 11. The movable mandrel, mounted in the press ram, bends the preform into a circle as it descends. To remove the workpiece, the mandrel can either be pushed out of the tube or, with light-duty forming, the mandrel can be fastened at one end and tubes can simply be slipped off.

By joining the two dies into a single set, both a preform and a finished tube can be made with every press stroke.

With stronger metals, such as stainless steel, tube forming may require three stages. As shown in Figs. 12 through 14, the two ends are curved first, then the open tube is formed and finally closed.

Compound Dies Help — Where the quantity of tubes to be formed is high enough to warrant the cost, compound dies are used. Such dies do the full two or three-stage forming job in one press stroke. It is not necessary to move the workpiece from one tool to another.

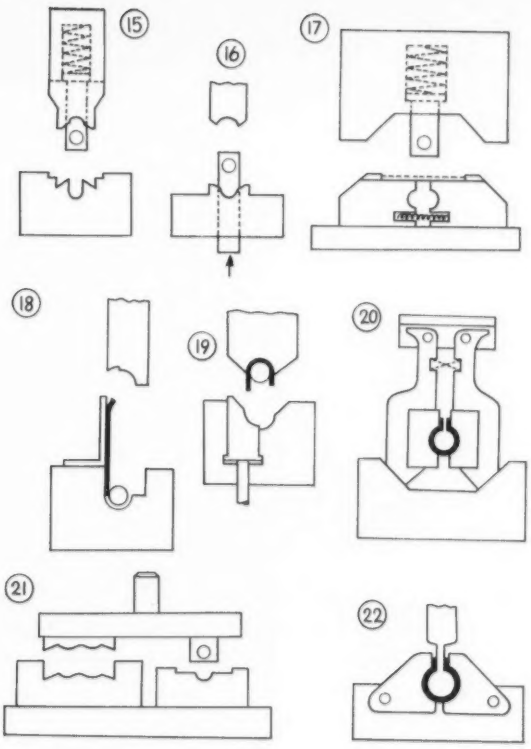
There are two basic compound-die designs for tube forming. One has floating members and may or may not have a mandrel holder. The other has horizontally sliding members which are cam actuated.

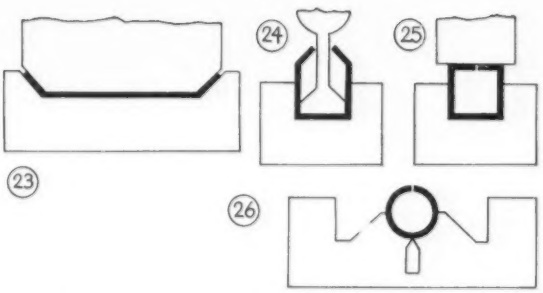
Fig. 15 shows the floating-member design. In operation, the blank is placed on the die opening and as the movable part of the tool descends, the mandrel bends the blank into a "U." When the preformed part touches the bottom of the die, the mandrel holds it there firmly. Compression springs between the mandrel-holder plate and the punch plate permit further punch movement to finish-form the tube.

Same But Different—Fig. 16 illustrates the same principle except that the mandrel-holder plate is built into the stationary part of the tool, not the movable member. Here the downward preforming is done by the action of the punch against the mandrel.

Fig. 17 sketches the design of a cam-actuated tool for producing short lengths of tubing from relatively thin stock.

All of the dies described to this point are used to make round tubes with butt joints; the simplest, most economical and widely used form. To form round tubes with other closures calls for special dies.





FOR LONG RUNS: Where quantity warrants the cost, compound dies do the best job. Figs. 15 and 16 each show a basic floating-member design; Fig. 17 illustrates an equally basic cam-actuated die.

SPECIAL CLOSURES: For overlapping a tube seam, use dies of the types shown in Figs. 18 and 19. If a flanged seam is preferable, the dies of Figs. 20 through 22 will produce one efficiently.

EXTRA HINTS: Figs. 21 through 23 show how square sections are made; Fig. 24, how to spring-relieve.

For Other Closures—To make an overlapping seam, for example, the blank edge must be precurved and there must be a proper step on the forming punch, Fig. 18. The compound die sketched in Fig. 19 also makes an overlap when one leg of the precurved workpiece is a bit longer than the other. The long leg bends first by striking a raised insert in the die cavity. The short leg bends next and overlaps the first section.

Tubes with flanged longitudinal seams are formed in stages, using either a series of single dies (Fig. 21) or compound dies as shown in Figs. 20 and 22.

The principles used to press-form straight cylindrical tubes are used for other shapes also. However, tapered tubes are always made with the aid of mandrels, either in separate tools or multi-stage dies.

Non-Cylindrical Tubes—Oblong cross sections also require either a compound die or a series of simple dies. The latter are preferably mounted in a press brake as a progressive die setup. Square cross sections can be made as shown in Figs. 23 through 25.

The length of the flat blank needed to form a particular tube should be established by trial. The formula $L = 3.1416d + 4t$ gives a good length approximation for a cylindrical tube with a butt joint. In the formula, "L" signifies length, "d" is the ID of the formed tube and "t" is stock thickness.

For welded, soldered or brazed butt joints, multiply "t" by 2.14 in the formula; for flanged seams, add twice the flange width to the nominal length required; for a lap joint, add the amount of overlap wanted.

Some Extra Tips—All forming surfaces on punches and die cavities must be perfectly round and well polished to insure best results. By clamping punch and die sections together to finish these surfaces, all polishing scratches will lie in the same direction as the blank movement.

Also, it's best that any burrs on blank edges should ultimately be inside the tube. This aids smooth forming and avoids scratching the die surfaces. To keep edge burrs on the same side of the blank, the stock material must be turned over after each shearing.

If springback causes any trouble, it can be remedied in several ways. One is to make the size of the die opening and that of the mandrel smaller by exactly the amount that the seam springs open.

If some slight marking of the tube is allowed, spring strain may be relieved by using a marking punch opposite to the seam after forming, Fig. 26. Where precision forming is necessary, finished tube shapes can be sized in special dies.

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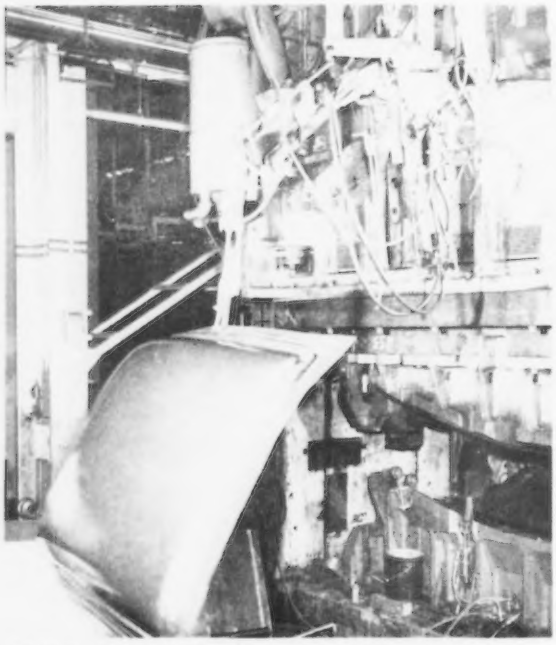
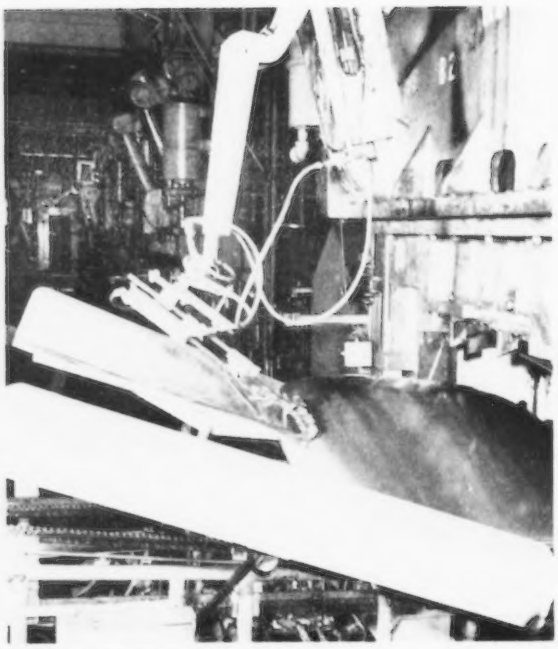


AGILE HANDLING: Floating gripper draws roof panel out of die and turns it over to land on air-chain shuttle, concave side down.



NO ROOM FOR HANDS: Remote controlled gripper removes panel from trim die. Low clearances would make manual handling hazardous.

Gripper Jaws Unload Panels

What's behind production bottlenecks? Quite often it's a matter of having to depend too heavily on manual handling.

It takes mechanized units to move unwieldy parts through confined handling routes.

For press operations, it means the handling units have to be adaptable to many situations.

By Herbert Chase—

Consultant,

Forest Hills, N. Y.

▪ Large panel stamping for passenger car bodies involve a number of knotty handling problems. If it weren't for mechanical handling equipment, the bulky, heavy panels would require much hard manual labor to handle them through the press dies.

Take the case of deep drawing with limited open die height. Manual unloading is far from easy. The space for lifting the stamping is restricted. And a panel drawn with the concave side up generally must be turned over before entering trim and flanging dies.

Answer in Automation—Problems of this nature are being met by different forms of automation at GM's Fisher Body plant, Flint, Mich. Flexible gripping devices, called Sahlin Iron Hands, unload the presses.

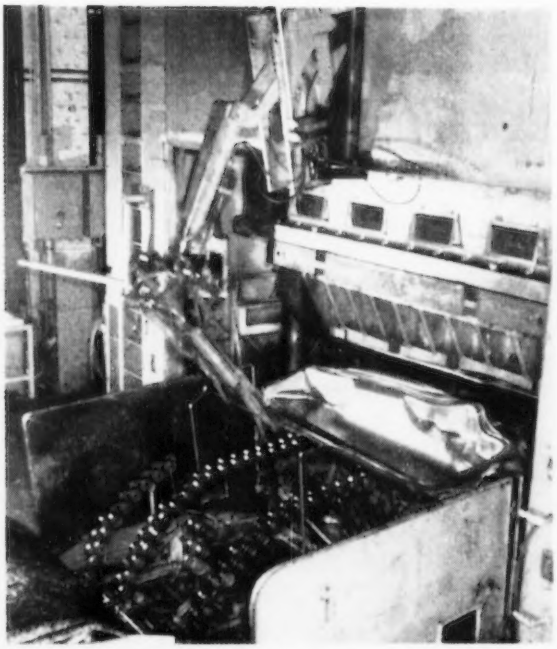
In some cases, the grippers turn the parts over. Shuttles do the loading into the trim and flanging dies.

Setups depend on the nature of the panel and the lengths of the runs. In either case, automation must pay for itself through savings or must be justified by safety or other factors.

Removal Made Easy—For drawing roof panels, it requires awkward manual handling to lift the stamping from a die that is so high. The Sahlin Iron Hand removes the stamping easily.

The floating jaw is adapted to turn the panel over, eliminating need for a separate device. The panel lands on a combination air-chain shuttle that advances the panel and loads it into the trim die.

Removal from the trim die again



LANDS ON ROLLERS: Deep-drawn quarter panel slides down rollers. Rocker arm will turn panel over on conveyor for transfer to the trim press.

LONG REACH: It's easy to load, but it takes a gripper with a long extension to remove toe panels from back of trim press.

Efficiently, Safely

requires a combination of high lift and withdrawal, but it's done effectively by the Sahlin gripper. The panel, released onto a shuttle, advances into the flanging die of a third press.

Replace Manual Hooks—Quarter panels, although smaller than roof panels, require blanks about 53 by 132 in. and are deeply drawn. As the press opening is quite limited, it formerly required hooks to unload the panel.

In replacing the hooks, the gripper unit lifts the panel, pulling it slowly upward and out of the die. A separate unit turns the stamping over while the arm motion is delayed.

Motions of the gripper are controlled electronically by the use of a new Sahlin remote control set in coordination with motions of the press. The time of gripping and releasing the stamping can be controlled to within $\frac{1}{8}$ second.

The rate at which the arm swings to pull the stamping out of the die is changeable. A fast rate makes it possible to "scoot" the stamping along a conveyor. With proper arm speed and release at the correct instant, the stamping turns over with no other device being needed.

In another setup, the stamping is released onto soft rubber rollers arranged around an arc. The panel rolls down 90°. A simple rocking device completes the turnover for advance into the trim press.

Lift for Deep Draw—Toe pans require a deep draw. The gripping device is provided with an adapter capable of a lift up to 20 in. It lifts sharply before drawing the stamping and releasing it down inclined bars onto a belt for advance to trim die.

The belt advances the toe pan up an incline to a height suitable for loading into die. It's loaded manually. But the die could not be unloaded manually without difficulty. The long reach from the back of the press would be tiring and would involve accident hazards.

Accordingly a long extension on the gripper provides the necessary lift before stamping is pulled out and released. The stamping slides down inclined bars until picked up by a belt for advance to the flanging press.

The gripper not only makes unloading easier but, as in the other cases, promotes safety.

In the trim press as in many others in this plant, the scrap trimmed from the stamping is shed into chutes passing through floor holes to a conveyor that carries the scrap to a baler.

Such scrap disposal is not only rapid and economical, but also keeps floors clear. It eliminates the safety hazard of manual scrap handling.

How to Cut Costs on Patterns

Castings are only as good as the patterns and cores from which they're made. This is one area, then, where it doesn't pay to cheapen up.

But there are many ways to get good patterns and cores at lower cost. How you use them also affects final cost of the casting.

▪ Casting costs are greatly affected by proper selection and use of pattern and core box equipment. Worn, poorly made or improperly chosen patterns raise casting costs in all foundry operations. Molding time is increased by mold patching and the need to cut partings and gates. Coremaking time is raised when cores need to be bedded or pasted together. Cleaning and chipping time increases in direct proportion to pattern finish and condition.

Castings are only as good looking and dimensionally accurate as the pattern equipment from which they are cast. Eye appeal of the end product, cost of machining and consequently final cost are affected by finish and accuracy.

The importance of finish, appearance and dimensional accuracy to casting buyers was demonstrated in a recent poll: 37 pct rated finish and appearance extremely important, and 54 pct said fairly so; dimensional accuracy was deemed vital by 43 pct, and another 43 pct considered it fairly important.

What Kind of Pattern?—Casting quality, size and complexity determine production methods and design of pattern and core box equipment. Correct selection of patterns to suit the method of production is therefore important to the casting buyer.

Low casting costs are possible only when pattern equipment is designed for ease of production and when pattern materials are suited for production quantities and casting complexity. Consider the question of initial pattern cost in relation to casting quantities, dimensional accuracy and casting finish.

Consider, too, how pattern material and construction relate to quantity and pattern life, and bear in mind the size and complexity of castings to be made. The accompanying pattern selection guide shows the type of pattern generally used in foundries for various quantities of castings.

Many buyers of castings have the mistaken impression that the cost of making a pattern prevents purchasing small quantities of castings. In the belief that conventional full patterns are always necessary, they turn to other methods which increase final cost and don't offer the advantages of a product cast to shape.

Simpler Types Will Do—Actually, the widest variety of castings can be made with simplified pattern and core box equipment; and contrary to common belief, it isn't limited to symmetrical or round forms. This type of equipment has wide application in manufacture of machine tool beds and bases, dies, gears, cylinders, crane drums and cast structural pieces.

Skeleton patterns and core boxes can be made of simple wooden pieces cut to form the major contour of the mold or core. Skillful use of this low cost construction not only reduces pattern costs, but often cuts molding and coremaking time. Light weight and simplicity

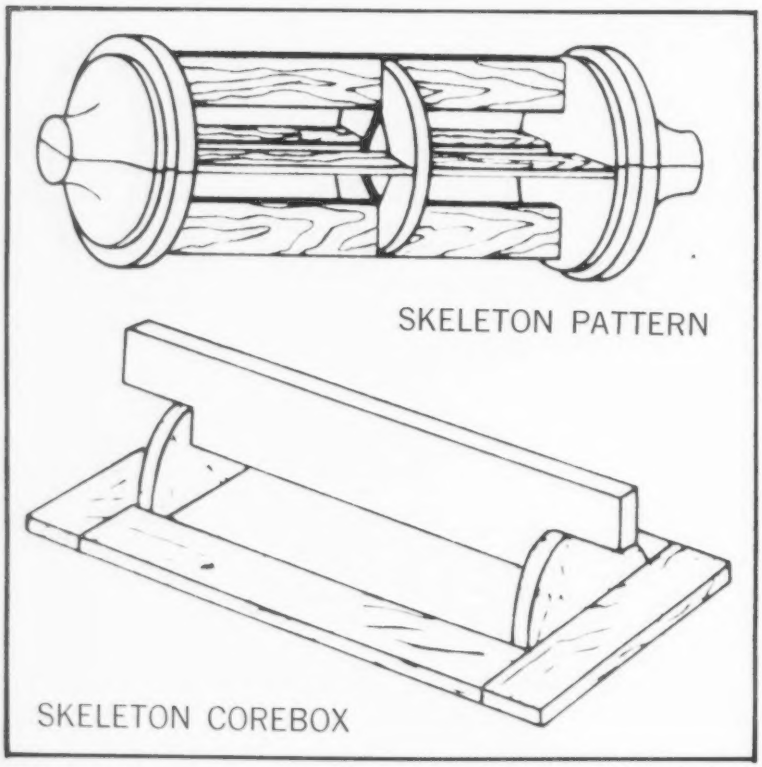


FIG. 1: Skeleton patterns and coreboxes can often be used instead of full conventional types. These are for a 9000-lb cable drum.

and Cores

By **R. B. Sinclair** and **W. N. Richards**—Management Engineering Div., Meehanite Metal Corp., New Rochelle, N. Y.

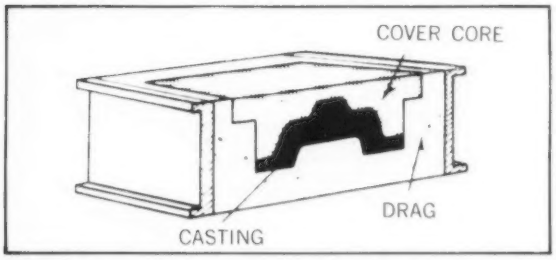


FIG. 2: In some instances it's more economical to use a cover core, which takes the place of a cope.

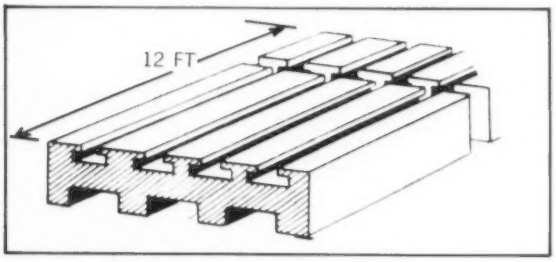


FIG. 3: Platen made entirely with cores eliminated patterns. Corebox costs ran 4 pct of pattern costs.

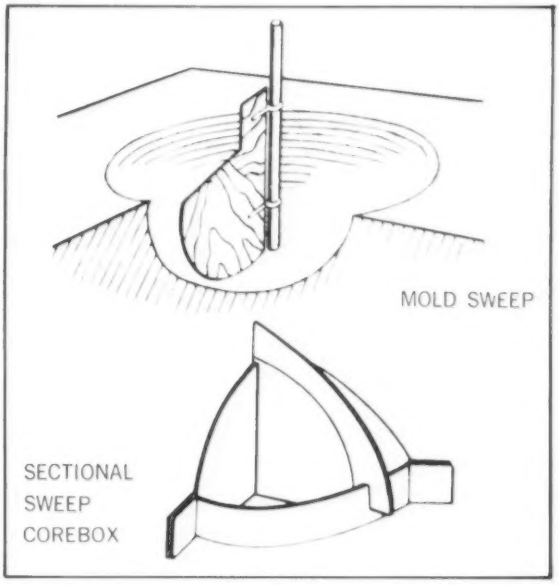


FIG. 4: Use of sweeps to mold 27,000-lb die kept pattern and core box cost to 4 pct of casting's price.

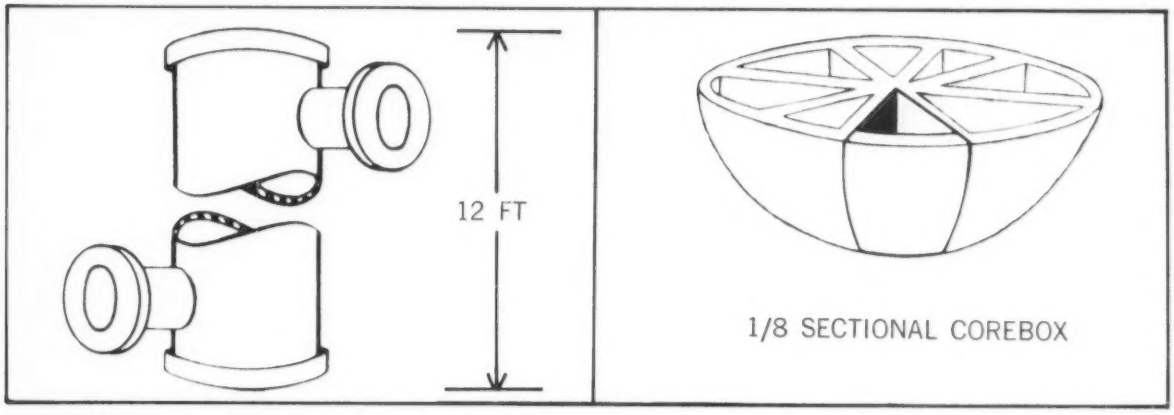


FIG. 5: Short segment pattern used to mold long columns is rammed and moved up a section at a time until the full length of the mold is made. Segmented cores are another means of keeping costs lower.

also cut handling costs and simplify storage.

Bedplates, bases, dies, cylinders and many other types of castings can be made from such equipment. Fig. 1 shows a skeleton pattern and core box used in making a 9000-lb cable drum. Pattern costs were less than 5 pct of conventional equipment costs.

Eliminates Cope — Cover cores are another way to hold costs down. This type of core takes the place of a cope and is used where the shape of the cope can be formed into a core. The core is then used to cover the drag half of the mold. A typical example of this economy is shown in Fig. 2.

Sometimes simple castings can be made entirely without pattern equipment. This group of castings includes cylinder liners, die rings, platens, punches and other simple shapes.

The 12 ft long platen shown in Fig. 3 is made from a half core box to form the T-slots, and pull-apart box to shape the lightening recesses. Core box costs amount to 4 pct of conventional pattern costs.

Where small quantities of large castings are required, tremendous savings are possible through use of sweep patterns and core boxes. As the name indicates, a simple wood frame, bar and sweep shape the

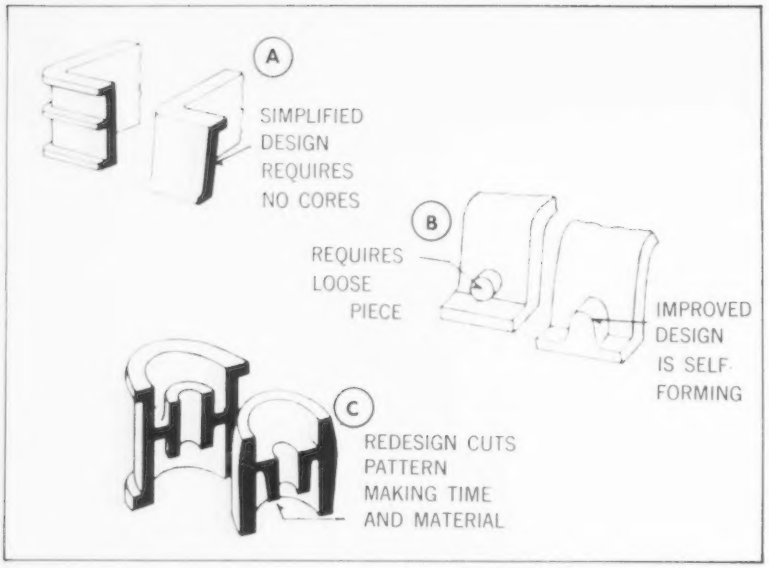


FIG. 6: Good design will (A) eliminate unnecessary core boxes, (B) avoid loose pieces to cut molding time and (C) simplify patterns and lower their cost.

Table 1 **Pattern Selection Guide**

Size	Quantity	Type of Pattern
Small Castings	1-20	Loose.
	20-100	Pattern mounted on match board or metal plate.
	Over 100	Cope and drag mounted on metal plates. Smaller patterns mounted on single metal match plate.
Medium Castings	1-10	Loose.
	10-50	Cope and drag mounted on wooden boards. Pattern of solid construction with glued and nailed joints, hardwood dowels and wax fillets.
	50-100	Cope and drag mounted on wooden boards. Pattern of built-up construction with standard wood joints, screw fastened, brass dowels and solid fillets.
	Over 100	Cope and drag mounted on plates. Metal pattern.
Large Castings	1-5	Loose.
	5-100	Cope and drag mounted on wooden boards. Largest patterns molded loose. Patterns of solid construction with glued and nailed joints, hardwood dowels and wax fillets.
	Over 100	Cope and drag mounted on wooden boards. Largest patterns molded loose. Patterns of built-up construction with standard wood joints, screw fastened, brass dowels and solid fillets.

Table 2 **How to Mark and Color Patterns**

Pattern Marking		Pattern Coloring	
The pattern should be marked with the following information:		Type of Surface	Color
1. Name of owner	5. Shrinkage allowance	Unfinished. Parting of a loose pattern.	Clear
2. Name of part	6. No. of pattern pieces	Machined.	Red
3. Casting material	7. No. of core boxes	Core prints. Touch cores. Cored sections at the parting line on the drag half of loose patterns.	Black
4. Pattern number		Stop-offs and tie bars.	Green
Core prints should be marked in sequence to correspond with placement of cores in the mold.		Unfinished surfaces when the pattern is repainted.	Yellow
The pattern number should be marked on all loose pieces.		Seats of loose pieces. Loose core prints.	Aluminum

contour of the mold or core. Molding and core-making are simplified, equipment is easy to handle and danger of mold damage through imperfect draw is eliminated.

Wheels, cylinders, pots and many other castings of more complex shape can be produced from one or more sweeps. Fig. 4 shows a mold sweep and a sectional sweep core box for a 27,000-lb tank-car die. Pattern and core box costs are less than 4 pct of casting sale price as compared to 50 pct for conventional equipment.

Do It With Segments — Long rectangular, square or cylindrical castings which are rammed and poured vertically offer an opportunity to use segment patterns. In the 12-ft refinery column shown in Fig. 5, a 36-in. long full-diameter pattern was used. The segment pattern was rammed and moved until the full length of the mold had been made. Total pattern costs were $175, as against $1280 for conventional equipment.

Casting design is an important factor in patternmaking costs. Design dictates complexity of the pattern, method of construction and the number and types of cores required.

A well-designed casting invariably requires simple pattern equipment, fewer core boxes and avoids the use of loose pieces, stop-offs, re-entrant angles and the like.

Fig. 6 illustrates three important areas in which good design will improve a casting and cut pattern costs.

Finally, pattern identification is important, particularly where many parts, loose pieces and core boxes make a complete set. Correct identification and coloring eliminate errors in assembly and speed up production.

Weld Copper Cooling Coils for Fast Production

With a premium on efficiency and safety, production costs can get out of line.

It happened with the cooling coils on vacuum furnaces. How can you mount the coils effectively?

It's worth the time and effort to find the best technique.

▪ In most vacuum melting furnaces the chamber has to be water-cooled to dissipate heat radiating from the crucible. Early furnaces used water jacketing.

But jacketing makes it impossible to concentrate cooling at critical points. It complicates repairs or alterations to the vacuum chamber. Should a spilled melt burn through the bottom, the jacket would be a hazard.

National Research Corp., Cambridge, Mass., a pioneer in vacuum metallurgy, and its manufacturing subsidiary, NRC Equipment Corp., Newton, Mass., have abandoned the use of a jacket in favor of copper cooling coils.

Production Problems—At first, the copper coils were silver brazed to the stainless steel chamber using a hand torch. It was a slow process, resulting in high costs.

After study, the company replaced silver brazing with a welding technique. The NRC production staff, aided by engineers from Air Reduction Co., worked out the new method using the Airomatic welding process.

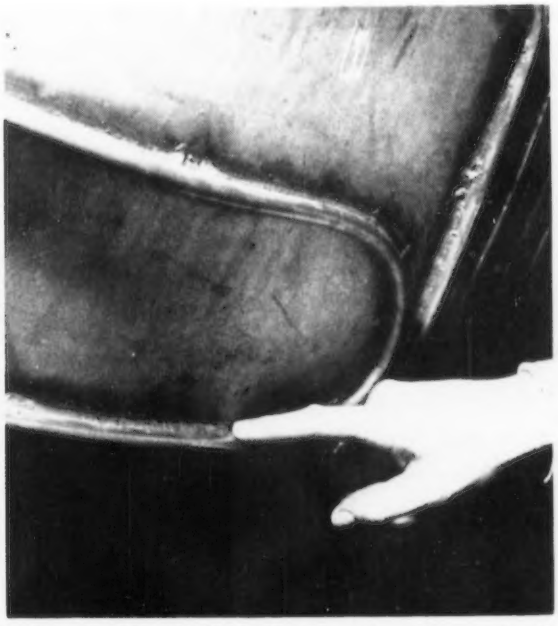
By welding the cooling coils, a better bond is achieved with tenfold increase in production. Fewer men are required to produce each unit. Material handling is simplified.

The result is an overall reduction of costs. NRC no longer has to pay a premium to offer furnaces with advantage of cooling coils.

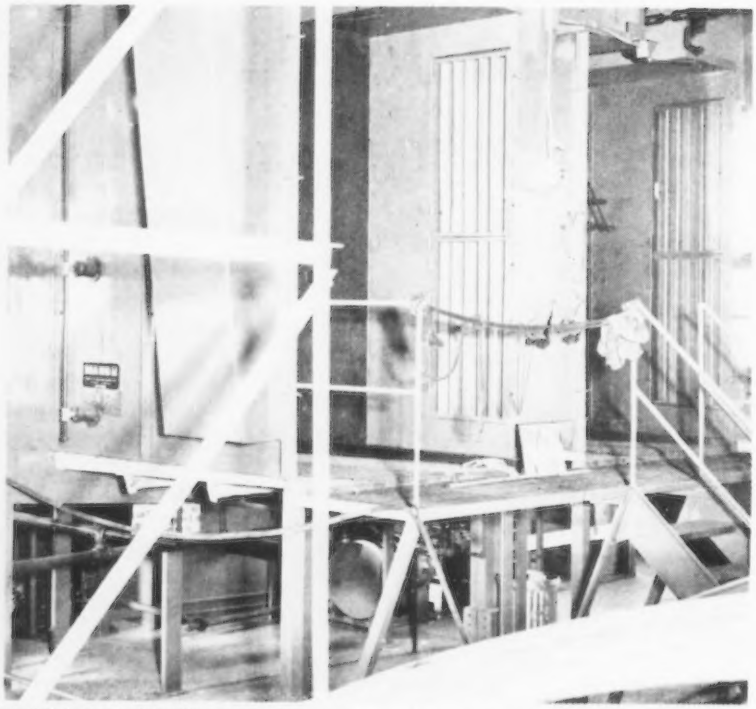
Half a Mile of Tubing—One model of vacuum induction furnace with a capacity of 2400 lb of molten steel takes almost half a mile of cooling coils. In welding the tubing to the furnace tank, a gas mixture of argon-helium flows at 20 cu ft per hour to shield the 0.035 in. diam A-110 silicon-bronze filler wire.

Vertical, flat, and horizontal welds can be done without repositioning the tank. Careful control of heat and welding speed, plus operator's skill, prevents burning through the copper walls. The cooling coils are given a final test under 150 lb hydrostatic pressure. Coils can be relocated if necessary.

CHOICE METHOD: Operator does fast job of welding cooling coils to vacuum furnace tank.



VERSATILE BOND: Technique produces strong bond, but tubing can be repositioned if necessary.



ENTRANCE HERE: Ventilators keep solvent fumes from spreading out of spray area. Chain conveyors carry parts through entire line.

Flow Coat Paint for Ease and Safety

The problem of large open dip tanks is how to control dangerous fumes.

By closing the system and spraying instead of dipping, vapor control is simplified. And there's an unexpected benefit in ease of cleaning the system.

▪ Flow coating is now the method of priming fenders and other sheet steel stampings at Pontiac Motor Div., Pontiac, Mich. It's a departure from the prior method of dip coating the parts.

Advantages are many, but the most important are savings in labor, greater safety, and a superior finish.

For dipping, two interior open tanks held 15,800 gal of primer. They were not only a serious fire hazard, but entailed expensive cleaning on week-ends at overtime charges.

Closed Tanks Safe—In the new setup, there are no open tanks. Flow coating is done in two booths, each having 80 spray jets.

Excess primer drains off and returns to a closed supply tank for each line. There's no exposure of volatile solvent to air except in the booths and drain tunnels. In these, the spaces can be filled instantly with CO_2 should fire occur.

The two 400-gal supply tanks draw primer from a closed storage tank in the basement. Solvent storage tanks supply solvent to keep constant viscosity.

Reuse Solvent—One of the two solvent tanks receives solvent that is used to wash down coating booths and drip pans. This solvent passes through filters before being returned for reuse.

Careful loading of parts insures that recesses will drain and not trap primer. Overhead chain conveyors carry the parts through flow coating, drain and baking areas.

In each flow coating booth, the $\frac{3}{8}$-in. jets apply primer at many angles, from front, rear and sides, from top and bottom to insure coating of all surfaces. Much of the excess drains off in the booth and the remainder into drip pans.

Key in Controls—Control of temperature and viscosity keeps drops from adhering to edges of parts and holds coating thickness between 0.0008 and 0.0010 in. The specified booth temperature is 100°F.

While some so-called "fatty" edges do occur where the drips leave the parts, it's possible to keep such edges where they will not show in the final assembly.

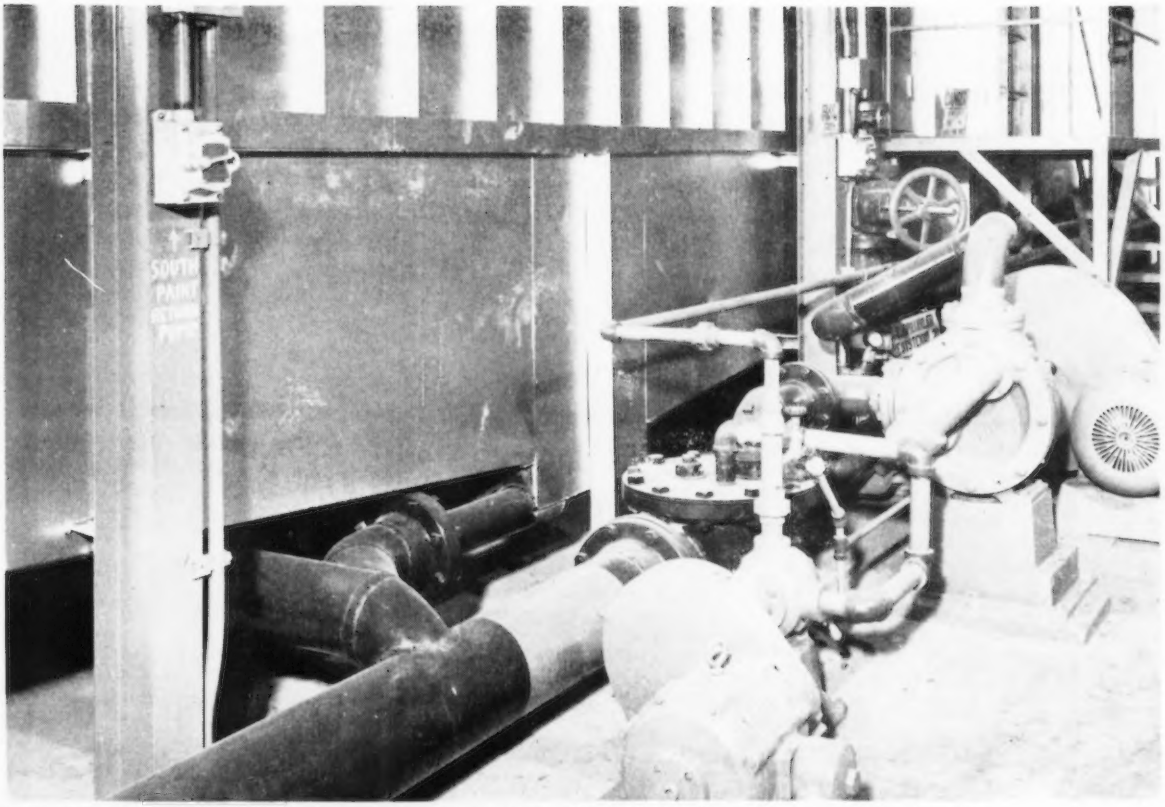
A viscosity meter continuously checks the primer oil supply to each booth, adding solvent as needed.

Temperature of the primer is held close to 77°F. If it rises above this temperature, a cooling system removes heat. If primer temperature falls, heat is added in an exchanger.

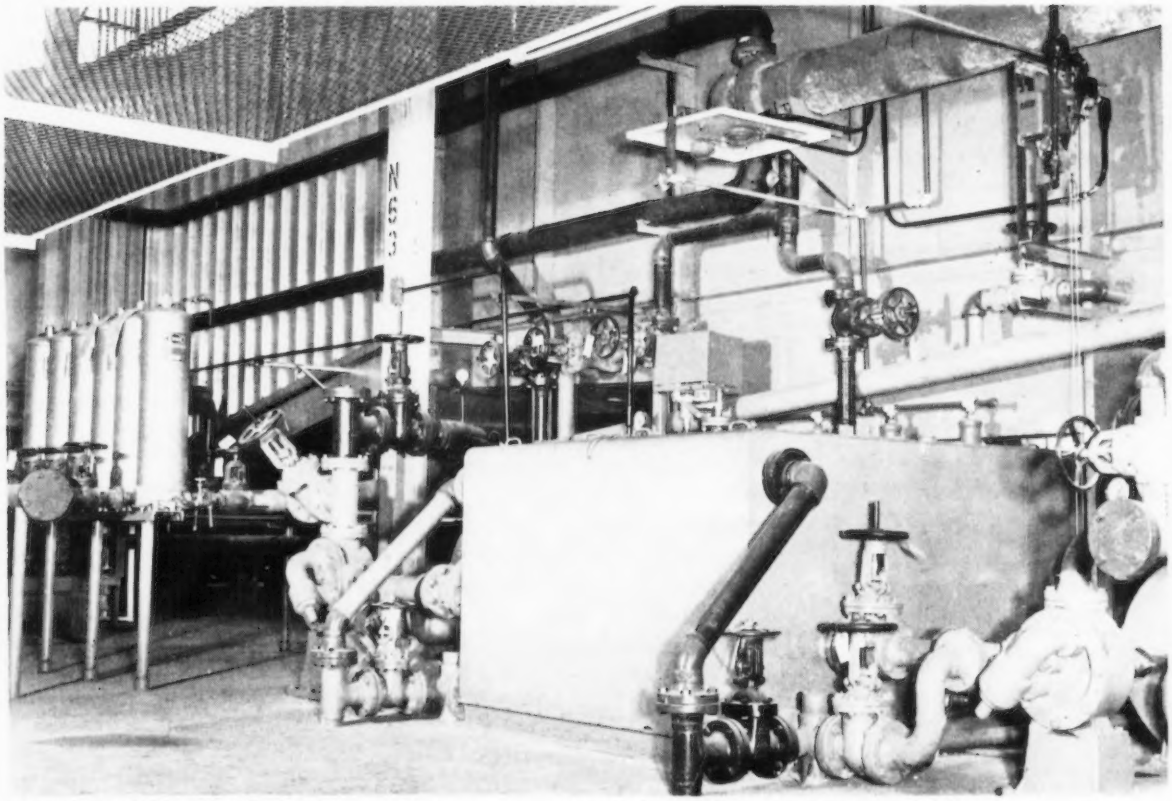
Draining time is 20 minutes with temperature in drip areas at 100°F. If parts are abnormally cool, this temperature can be elevated. At the end of drip period, the parts enter 600-ft gas-fired ovens at 385°F. Baking time is 30 minutes, sufficient for complete oxidation of the primer.

After leaving the oven, the parts remain on the conveyor for cooling to room temperature. Capacity of the system is 110 sets of parts an hour.

After parts cool, transfer to another conveyor is done by hand. This conveyor holds 200 sets of parts, so that, if delays occur in sanding and finishing booths, the flow coating system can keep operating.



CLOSED SYSTEM: Pumps drain primer that drips off. Added solvent keeps proper viscosity.



FLUSH WITH SOLVENT: Filters (left) remove solids picked up by the solvent in booths and drip pans.

ALL KINDS: Pins and fixtures of Diamonite alumina show variety of intricate shapes it'll take.

Alumina Puts Hot Work in Harness

Holding fixtures and locators for welding, heating and brazing have to take a lot of abuse.

Alternate heating and cooling, high temperatures, mechanical shock and abrasion quickly destroy strength and accuracy of most materials.

Here's where sintered aluminum oxide will do a job.

▪ Aluminum oxide ceramics are finding use as locators in resistance and induction welding, heating and torch or oven brazing work. The material offers a combination of properties that make it ideal for positioning and insulating parts in jigs and fixtures requiring extreme accuracy.

Alumina, as it's commonly called, is a hard, nonmetallic substance that can be pressed and fused into virtually any shape. Its composition is similar to synthetic sapphire, except that solid alumina is multicrystalline while the gem is a single crystal of Al_2O_3.

Several methods are used to form the loose material into a dense, homogeneous mass. They're all based on pressure and heat—pressure to give shape to the mass and heat to vitrify the shape into a solid. Properties can be varied with small amounts of other materials, just as alloying elements are added to metals.

Hard and Strong—The result is a fixture that will maintain accurate location over a broad range of conditions. Hardness is about 90 Ra, and 9+ (next to that of diamond) on the Mohs scale.

Sintered alumina fixtures can take a lot of mechanical abuse. Compression strength runs upwards of 400,000 psi, tensile strength at room temperature is about 30,000 psi, modulus of rupture is more than 50,000 psi and Young's modulus of elasticity ranges from 45 to 60 million psi.

Resistance to thermal shock is high; cylinders ⅜ in. OD, ¼ in. ID and 2 in. long have been quenched from 200°C in water at 15°C without cracking. Sintered alumina won't burn, corrode, deteriorate or melt under usual operating conditions. Softening temperature is above 3100°F. It's also impervious to moisture and most chemicals.

Because the material is a nonconductor of electricity, no extra insulation is needed. Resistivity is infinite at room temperature and over 100 megohms at 1000°F.

Close Tolerances—Alumina locators and holding fixtures can be made to extremely accurate dimensions. Diamonite Products Div., United States Quarry Tile Co., Canton, O., normally holds to ±0.005 in. on dimensions up to ½ in., and ±1 pct on larger sizes. Tolerances of ±0.00005 in. can be met when required. Dimensional stability is good over a wide range of temperatures.

In the pressed state before sintering, the material can be drilled, turned, bored and threaded, both internally and externally. Once it's fired, machining becomes a problem. Small amounts of stock can be removed with resinoid-bond diamond grinding wheels and a soluble oil and water coolant, but profiling is best done while the piece is being formed.

Long Life—That alumina ceramics will stand up in long runs is borne out by the experience of a resistance welding equipment maker. Where a plastic locator softened from heat radiation after a few hundred parts and failed in one day, a Diamonite locator went to the end of the run—a period of 10 months.

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That's why stainless steel carries so much selling power in the showroom and even more on the used car lot.

For more facts about stainless steel see your supplier or write: ELECTRO METALLURGICAL COMPANY, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y.

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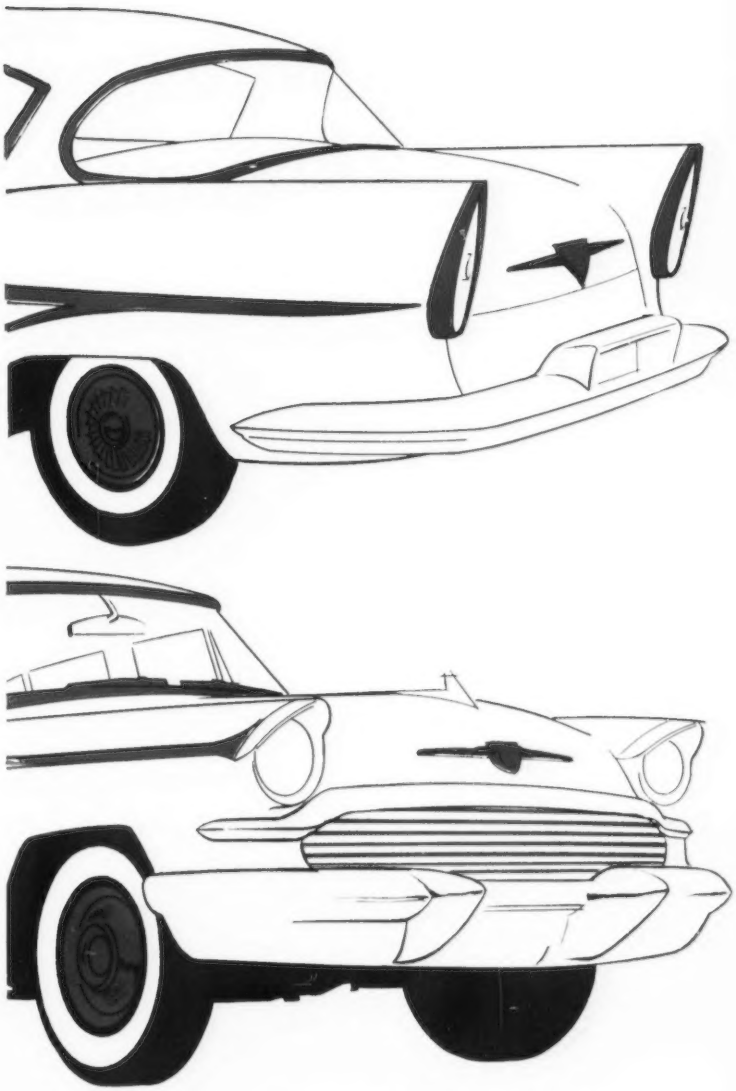
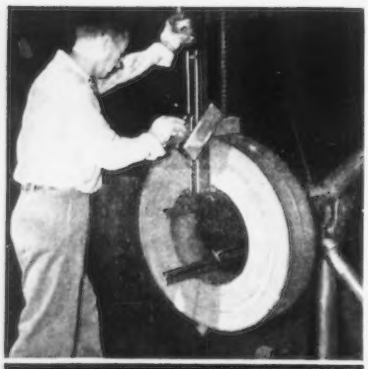


Stainless steel styling is easiest of all to sell! Body and window mouldings, wheel covers, grilles, door handles and even roofs are stainless steel this year!

The terms "Electromet" and "Union Carbide" are registered trade-marks of Union Carbide Corporation.



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The Dixon Coil Grab saves labor and speeds coil handling by enabling one man to lift, turn and load coil on the stock reel with a single, easy motion. Forged steel wedge speeds separation of stacked coils. Positive grip and support eliminate coil damage, assure operator safety. Standard models available from stock. Capacities from 1,000 to 5,000 and 10,000 to 15,000 lbs., for coil widths ¼" to 48".

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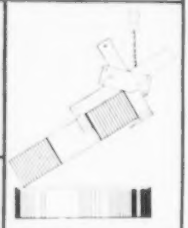
MODEL A COIL GRAB
Wedge separates coils easily. Lifts and turns in one motion.



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AN OUTSIDE JOB

From The Files Of
The American Arbitration Association

Stanley D. held down a job as maintenance mechanic in a metal wire and screen plant. At the same time, he conducted a thriving contracting business on the side. It seemed that whenever a home owner in the neighborhood needed a new garage built, a lighting system installed or a driveway cemented, he would call on Stanley to do the job. During 1956, Stanley had so much work of this kind that he not only absented himself from work quite often but had to hire a part-time helper too.

Management was getting a bit fed up with this state of affairs. So, early in 1957, when Stanley telephoned to say he'd be out that day, the personnel manager decided to fire him.

The union promptly filed a grievance, claiming that the reason for Stanley's absence that day was his wife's illness. "I wanted to explain that to the watchman who got my call," Stanley testified, "but he hung up on me."

Don't Believe It—"We don't believe it," answered the personnel manager. "You're trying to misrepresent your absence, which is just another reason why you deserve to be fired. And if the watchman did hang up on you, how come you didn't call him back to offer your explanation?"

At this point the union's international representative cut in: "This issue of the telephone call really has nothing to do with it. You didn't fire him because of alleged misrepresentation, you fired him because of his outside work. But that's something you've known about and tolerated all along. So what gives you the right to get tough about it all of a sudden?"

After all the arguments and evidence were in, the arbitrator declared the hearing closed, in accordance with the rules of the American Arbitration Assn., and retired to make his decision.

(Ruling On Opposite Page)

NEW FILMS

"Research - Key to Progress" should be a very popular film. It spells out the role of scientific research in the nation's economy. 15 min. 16-mm color. Public Relations Dept., Armour Research Foundation of Illinois Institute of Technology, 10 W. 35th St., Chicago 16, Ill.

"Be Wise—Palletize" emphasizes the importance of power strapping and palletizing of loads—particularly lumber. Signode Steel Strapping Co., Film Dept., 2600 North Western Ave., Chicago 47, Ill.

"Tooling the Band Saw for Production" points out how versatile band saws are. It shows them shaping, slotting, splitting or facing. 10 minutes. 16-mm color, sound. The DoAll Co., Des Plaines, Illinois.

"Molded Masters of the Btu" reviews four thermal insulations for piping and equipment ranging from 200 to 1900°F. Color sound slidefilm. The Magnesia Insulation Mfgrs. Assn., 1317 F St., N.W., Washington 4, D. C.

The Arbitrator Ruled:

He said the mere fact of the outside contracting work, by itself, would not justify discipline, especially where the company had tolerated it in the past. On the other hand, he added, the grievance was not blameless, especially in the matter of the phone call. Under the circumstances, he reinstated the man, but without back pay. This put the employee on notice that further absenteeism caused by outside work would mean discharge.

Caution: The award in this case is not necessarily an indication of how arbitrators might rule in apparently similar disputes. Each case is decided on the basis of the particular history, contract, testimony and other facts involved. Some of these essential details may have been omitted in condensing the original arbitration for brief presentation.

Keystone integrated aluminum conductor systems feature long life, minimum downtime, low installation costs, increased safety and high current capacity. Surrounding photo shows system being installed.

No winter downtime with Keystone Aluminum Conductor System

For two winters—and going into the third—Niagara Mohawk Power Company, Buffalo, has enjoyed trouble-free service with a Keystone integrated aluminum conductor system. The system replaced one of wire used with Niagara's traveling coal storage towers.

Service conditions are severe here. Ice is a big problem. Sulphuric acid fumes from coal piles cause corrosion. But with aluminum Inverted-V Keystone conductors and enclosures, these problems are solved.

Other advantages of Keystone integrated conductor systems improve operations indoors, too. Low voltage drop—rugged components—no wires to burn down. Steady operation is assured.

For further case history information and data on use of Keystone Aluminum Conductor Systems, call or write *Electric Service Works, Delta-Star Electric Division, H. K. Porter Company, Inc., Philadelphia 32, Penna.*

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Profitable Trends in the use of Refractories

Photos courtesy of Atlantic Steel Company

New furnaces start right with Laclede-Christy Refractories

Specifications on Atlantic Steel Company's new 13″ Bar and Rod Mill included a 90 ton per hour reheating furnace. They called on a leader in the field, Rust Furnace Company, to build it. Rust's experience and knowledge prompted their use of Laclede-Christy refractories.

The installation included Spallac super-duty fire brick which has proved its long-lasting qualities in other installations . . . requiring minimum maintenance and reducing downtime. Spallac super-duty features high refractory value, good volume stability, and high resistance to spalling. Also included was Laclede King high duty brick.

To start your furnace right—for new or replacement installations, it pays to use Laclede refractories. Call Laclede-Christy Works, Refractories Division, H. K. Porter Company, Inc., St. Louis 10, Mo.

H. K. PORTER COMPANY, INC.
REFRACTORIES • DIVISION
LACLEDE-CHRISTY WORKS

TECHNICAL BRIEFS

Convert Electricity Direct From Heat

An ordinary flat iron converts electricity directly into heat with a very high rate of efficiency. But direct conversion attempts in the other direction—from heat to electricity—so far have achieved extremely low efficiencies.

Now, researchers have come up with a thermionic converter of 8 pct efficiency. And it shows considerable promise in the future.

▪ Direct conversion of heat energy into electrical energy may possibly replace currently-used indirect methods some day. This is pointed up by recent developments with a new thermionic converter.

Invented by Dr. V. C. Wilson at General Electric Research Laboratory, New York, the device takes advantage of the fact that electrons can be "boiled out" of a hot metal surface; this produces electric current directly. Such experimental converters already have changed more than 8 pct of applied heat energy into electric power.

In effect, it opens the door to new ideas for generating electricity directly from heat without using machines that have moving parts. At present, just about all modern electric power plants use the indirect method (i.e., heat makes steam that spins a turbine; this drives a generator.) Such steam turbine-generators are highly ef-

Want More Data?

You may secure additional information on any item briefed in this section by using the reply card on page 169. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

ficient (about 40 pct.) Direct conversion proponents are quick to point out that the new system's 8 pct nowhere near approaches this.

Conservative Forecast—According to Dr. Guy Suits, G. E. vice president and research director, "The thermionic converter is strictly one of those results of research that should be judged for the knowledge it provides and not at this time as a commercial product." He points out that the converter "is an extremely important scientific contribution" but "we do not want to imply that solar-powered space ships or inexpensive atomic power plants are just around the corner because of this invention."

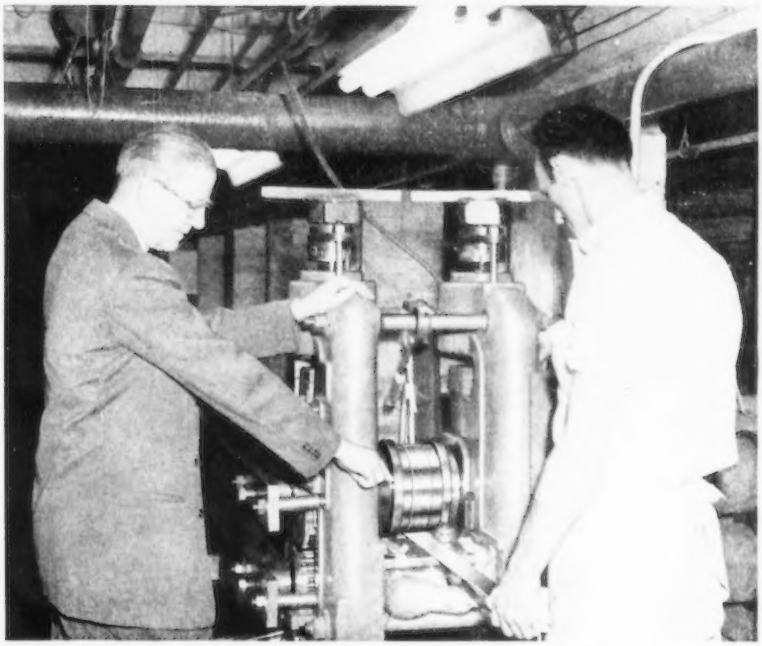
"We cannot predict when—or if—the remaining scientific and economic problems inherent in direct heat-to-electricity conversion will be solved in a commercially acceptable manner," says Dr. Suits. Yet, it's obvious developments thus far are tremendous contributions to the solution of one of the age-old riddles of the electrical industry.

Electricity lighting this bulb comes directly from heat.

Over-Simple Explanation—In a very few words, the thermionic converter is a device in which a hot electrode emits electrons and a cold electrode collects them. The electrons are sent through an external circuit and made to do work.

Most attempts at direct conversion have employed either ther-

Proof of Vulcan Tool Steel Superiority



Cold rolling of critical heat resisting alloy stator vanes at D.E. Makepeace Company, Attleboro, Mass.

Vulcan Service PLUS TCM Steel solves tough rolling problem on jet stator vanes

Vulcan sales engineers, working closely with the tool experts of D. E. Makepeace, faced a tough and exacting problem: How to increase the service life of rolls used in cold rolling critical jet engine heat resisting alloy stator vanes.

As a result of joint investigations, design changes were recommended and adopted. The result? Roll life was multiplied.

Vulcan engineers went further. Despite the fact that other grades of tool steel had been tried and found unsatisfactory, Vulcan engineers predicted that *additional* improvements could be made by using Vulcan TCM steel. This recommendation, too, was adopted. The result? The already increased roll life was *trebled*. Net result: substantial savings with increased roll life, less down time and greater productivity.

This same engineering help is available to you without charge. For the name of your nearest Vulcan representative, write, wire or call collect. Vulcan Crucible Steel Division, H. K. Porter Company, Inc., Aliquippa, Pa.

H. K. PORTER COMPANY, INC.

VULCAN CRUCIBLE STEEL DIVISION

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LESCHEN WIRE ROPE DIVISION

mocouples or thermogalvanic cells. Nothing developed so far, including the new thermionic converter, has provided any serious competition for the big job of producing large amounts of electricity. But some of these methods find useful application in special situations where efficiency is unimportant.

In telephone transmission systems, relay stations are often located in remote areas in which commercial power is not available. Bell Telephone Laboratories recently developed a thermocouple device

These devices convert over 8 pct of heat energy to electricity.

to power transistor-type amplifiers used in these stations. The efficiencies are very low. The system is practical, though, since the amplifier requires only a watt or two of power and the only maintenance required is infrequent replacement of a gas tank supplying fuel to heat the hot junction.

Russians Use One—The Russians employ a thermocouple device to generate electricity in kerosene-powered radios. Here again, low efficiency can be tolerated—Russian scientists report it to be about ¾ of 1 pct.

One obvious difference between the thermionic converter and the thermocouple is that in the latter, the metals are separated by a gas at very low pressure. There is an electrical flow between the elec-

trodes, but there is less flow of heat than through a metal. Thus the electrodes can be at different temperatures, and the efficiency is greatly increased. G. E. scientists hope thermionic converters ultimately may be able to change more than 30 pct of heat directly into electricity.

Special Testing Helps Find Best Material

When there's no ideal material for a specific application, special testing sometimes becomes the single ingredient that makes the product possible.

This has been demonstrated by The Foxboro Co., Foxboro, Mass., in selecting low carbon steel tubing for the manufacture of its thermocouples. Only certain heats are found to contain the particular properties acceptable to the firm. And only painstaking test work can isolate them.

Here's The Problem — In these thermocouples, the iron tube not only encloses and protects the asbestos-covered constantan wire,

Pieces in pot of molten tin get tested by a millivoltmeter.

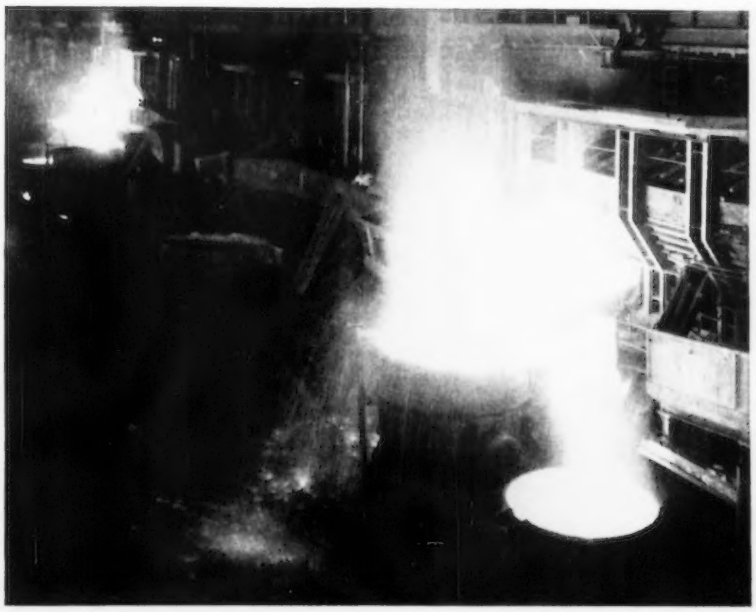
which is the negative element, but is also joined to the wire by a welded plug so that it acts as the positive element. The problem is to select low carbon steel tubing with the electromotive force characteristics which make it suitable for use as the positive element in the thermocouples.

Superior Tube Co., Norristown, Pa., supplies AISI type MT-1015 low carbon tubing to the company. Extensive tests by the Foxboro laboratory showed that the MT-1015 tubing had the required thermal emf for the thermocouple application. The tests also showed that it had additional desirable properties, such as good weldability, important in making the connection to the constantan wire.

Here's The Catch — However, MT-1015 tubing of exactly the same chemical analysis can vary in its thermal emf—so there remained the problem of selecting tubing whose thermal emf would be uniform from lot to lot.

To solve this, inspection experts of both user and supplier devised the following test procedures which guard against any tubing getting into a thermcouple unless it has the desired emf characteristics:

When Foxboro's tubing stocks be-



Increase production of your existing open hearths

We concur with the opinion of many steel plant operators that modernization of existing open hearth facilities represents an economical and often overlooked way to materially boost annual tonnage—with a minimum capital investment.

The required modification of present furnaces to assure a substantial increase in production involves a thorough design study—not only of hearth size or capacity, but also with respect to all other essentials of furnace structure from burners to stack. We have successfully completed a great number of such projects, and will welcome an opportunity to make a complete review of your steelmaking facilities.

From first heat to heat treat, look to **LOFTUS** *Engineering Corporation*

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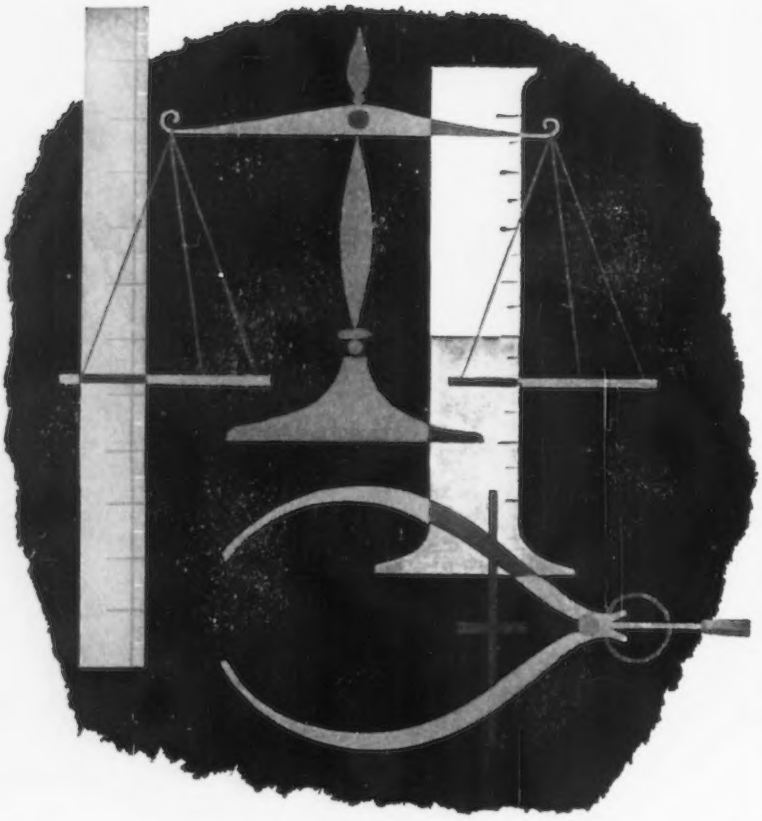

how do you measure economy?

economy is not measured by price alone!

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When you are concerned with metal abrasives there are many yardsticks that must be applied to truly measure economy.

How long will an abrasive last? How long before it breaks down into fines and becomes inefficient?

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How efficiently does it perform and what is the time cycle for good performance?

To sum it all up — the economy of using any abrasive can be measured by the **cost per ton of metal cleaned!**

On every count, Malleabrasive has proved its superiority over the years in hundreds of plants.

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MALLEABRASIVE

THE GLOBE STEEL ABRASIVE CO., MANSFIELD, OHIO ®

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gin to run low, the company notifies the supplier. Then they, in turn, send two 3-ft samples of several heats of MT-1015 to the company for testing. Each sample tube is checked for thermal emf characteristics and the heats found suitable are set aside by the supplier for redrawing to finished sizes.

Spot-Checks Tube — The first 2000 ft of tubing drawn from the heat is spot checked at the supplier's mill by a Foxboro inspector. If acceptable, the entire heat is then drawn to finish size.

Samples from each box of tubing of finish size received at Foxboro are given a final check.

Ultrasonic Probers Find Tube Flaws

Ultrasonic waves projected through water help a tubing fabricator probe for invisible flaws in welded pressure tubing as it's made.

Employed by Tubular Products Div., Babcock & Wilcox Co., Beaver Falls, Pa., the ultrasonic quality control setup constantly checks the carbon steel tubing as it rolls along the production line. High frequency sounds project into the metal during testing; defects a signal which registers as a "pip" on an oscilloscope.

Using this test method, skilled observers locate the defect precisely by referring to the point at which the sound entered the metal.

Air Is No Help—Air, however, is a poor conductor of sound. So users of ultrasonic techniques usually put the sound into the metal either by direct contact or through a coupling medium such as water. This firm chose the latter because after two years of experiments, this method proved readily adaptable to tube fabrication methods. It picks out both internal and external weld faults.

At present all the company's electric resistance welding mills use

such equipment. It gives quality control men a continuous "reading" seconds after welding.

When it singles out a flaw beyond a previously determined limit, a warning light goes on, a horn blows at the mill inspector's station, and a spray gun automatically marks the affected tube.

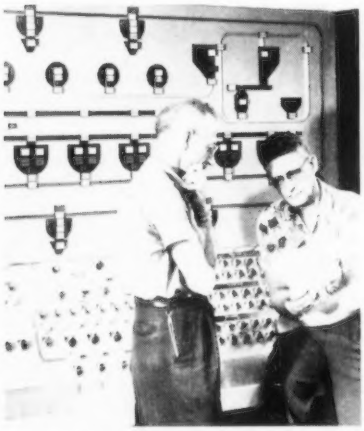
Produces Carbon Parts In Minutes, Not Weeks

Combining two steps into one in a new process lets a maker of carbon products cut its manufacture time from eight weeks to less than eight minutes.

The process, which has been under intensive development for several years by Union Carbide Corp., is now in production operation at the National Carbon Co. division's new multi-million dollar plant at Lawrenceburg, Tenn.

Use Giant Presses — The highly automated two-step method forms carbon products to shape in giant presses while high electrical currents simultaneously heat the product to baking temperature.

In the past, the firm's carbon technology was based on using a mix of carbon flour and some form



The plant controls all carbon part making from this console.

of tar or pitch as a binder. The mix was heated to near the melting point of the binder, cooled, and extruded to shape in presses. Later it was packed into gas-fired furnaces and baked for several weeks.

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WITHOUT SEALANTS

Ⓑ NYLOK fasteners are sure protection against gasoline, oil, air, and alcohol leaks. Stay locked in ANY depth...need not be fully seated...won't vibrate loose.

Permanent insert of tough, resilient nylon is readily adapted to any Ⓑ threaded fastener. Won't shrink, dry, age, or turn brittle. Unaffected by temperatures to 250°F...cannot damage threads or seating surfaces.

Ⓑ NYLOK fasteners can be reused time after time. Nylon insert regains original shape after using...retains original ability to adapt, lock, and seal to any thread.

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- lost time in application
- gummed-up threads that prevent reuse
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ASSURES
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- positive locking
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- smooth torque
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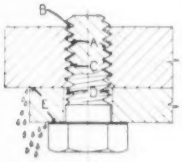
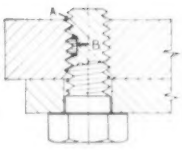
HOW NYLOK WORKS



STANDARD BOLT

← As bolt tightens, metal-to-metal union of LOAD-BEARING faces is made at (A). But, fluid entering at (B) flows downward on NON-LOAD-BEARING faces, leaking out at (D) and (E).

Lateral thrust of NYLOK pellet (B) → presses both LOAD-BEARING and NON-LOAD-BEARING faces tightly together. Fluid entering at (A) is stopped from further flow by NYLOK insert (B).



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Perforations perplexing you?

If you have a design problem that's got you down maybe Hendrick can be of help. Sometimes the easiest and quickest way to enhance a product's beauty is to include a pleasing pattern of perforations in its design. Hendrick perforated metal not only helps increase a product's overall attractiveness, but also adds to its saleability as well. And whatever material you're using . . . whether it's metal, masonite, rubber, plastic, hard or insulated board for decorative display or fabricating purposes you can draw on Hendrick's long experience and perforating facilities to fill the bill. Write for details.

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TECHNICAL BRIEFS

Electrical baking wasn't feasible with this mix. The coating of the liquid binder on the particles of carbon flour made the electrical resistance so high that extremely high voltage would have been required to force enough current through the mix to raise it to the necessary baking temperature.

Mix Does the Trick — Special processing of raw materials now results in a mix blend that provides enough contact between the particles to lower the electrical resistance to the point that allows the initial flow of current. As current heats the mix, the binder melts, and the pressure of the press forces it throughout the mixture. It results in a thorough and complete mix, and provides uniformity in the finished carbon product. This "telescoping" of operations results in the substantial shortening of the production cycle.

Heart of the new system is a special hydraulic press. This operates at an average pressure of several tons per square inch. The extreme flexibility of the process makes it possible to change operating pressures, temperatures, and cycle timing in varying degrees to produce carbon products with a variety of properties.

Resists Exposure

Steel windows for general use are under production that need no yearly repainting. Yet they resist outdoor exposure for years.

Developed by Truscon Steel Div., Republic Steel Corp., Youngstown, Ohio, the window owes its element-resistance to a new two-coat paint process. This seals the bonderized carbon steel or zinc surface against attacking elements.

Combines Two Coats—The process combines two different coats. One is an epoxy-resin base. The other is a smooth, hard, glossy finish coat of oven-baked paint. The

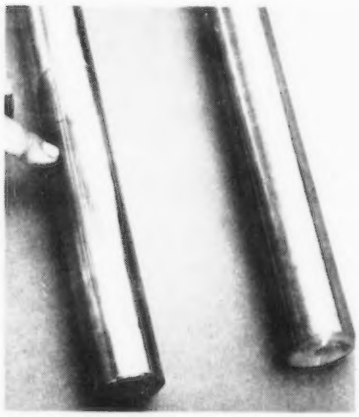
latter is an enamel appliance type finish, modified for exterior exposure.

Extensive field and laboratory tests indicate the coatings afford exceptional resistance to salt spray, humidity, water and other elements.

Hardened Carbon Steel Cuts Piston Wear

Sand contamination of the kind commonly found in a gray iron foundry necessitates constant and expensive maintenance of close-fitting precision equipment and often reduces its service life. This was a problem which faced Elyria Foundry Co., Elyria, Ohio. Here a vertical power pump, generating water pressures up to 2200 psi, cleans sand castings.

Although the pump was fitted with dust shields, and the water carefully filtered, fine sand particles



Old material scored during use, but hardened piston holds up.

caused piston abrasion. Such wear resulted in leakage and limited pump life to about 600 hours. The stainless-steel pistons could be reground twice but pump downtime and labor were expensive. New packing was needed each time a piston was reground and, added to labor charges and overhead jumped the cost considerably.

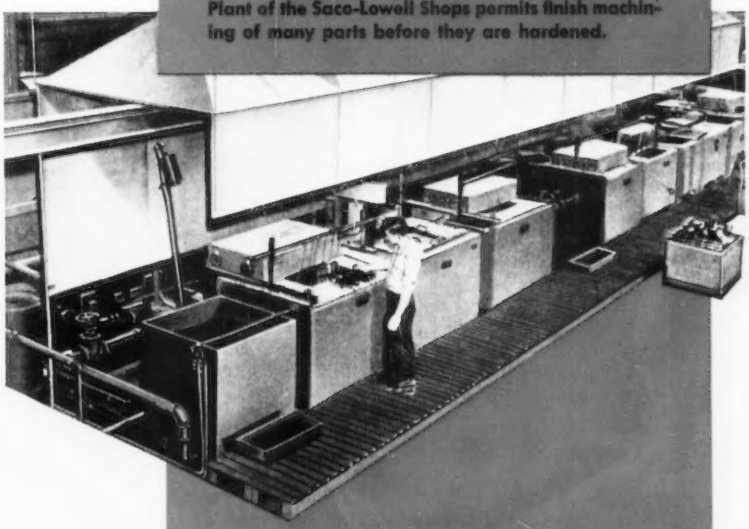
Calls For Help—So the company called on Chromalloy Corp., White Plains, N. Y., for help. This firm has a patented chromium diffusion process known as Chromallizing, which increases the heat, wear and corrosion resistance of iron and steel parts. In a cooperative effort, the two experimented with the use of Chromallized carbon steel pistons.

The Chromalloy process involves a high temperature exchange of iron and chromium atoms at the surface of the part; it provides the surface with a chromium carbide outer layer that is integral with the base metal.

Last Three Times Longer—Chromallized carbon steel pistons prove both three times more durable and less expensive than those made of stainless steel, says the company. Maintenance is negligible, packing need not be tightened or replaced and piston service life has been increased over 1800 hours.

Additionally, elimination of shutdown time for pump maintenance has created still greater economies.

TYPICAL! This salt bath line in the Edwards Plant of the Saco-Lowell Shops permits finish machining of many parts before they are hardened.



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No other method combines the speed, freedom from surface defects and overall efficiency of Ajax neutral salt baths in hardening engineering steels!

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TECHNICAL BRIEFS

Locknuts Reduce Wear, Maintenance Costs

Re-useable locknuts lower maintenance costs and reduce wear on a firm's pneumatic casters. The self-locking nuts permit fine adjustments to compensate for wear of wheel components. Thus they reduce vibration and additional wear.

Saginaw Products Corp., Saginaw, Mich., which makes the wheels, reports that they must be periodically dismantled and reassembled for replacement of tires, general cleaning and inspection. The same nuts may be used again and again. They can be re-tightened whenever necessary to adjust for wear.

Locknuts fasten together major components of this wheel.

Resists Vibration — Formed of a single piece of steel with a segmented locking section, the nuts are unaffected by the loosening effect of vibration. Solvent actions of oils or greases have no effect either. The nuts require no lock washers, cotter pins or other devices to keep them from working loose.

Eight of the self-locking fasteners are used on each caster.

A ¾-in. thin nut provides fine adjustment as the pivot point between the caster fork and the forged steel top plate. A second ¾-in. thin nut holds the axle in

place. The thin nut is approximately 70 pct the height of a regular locknut but has comparable holding power.

Hold Wheel Together — Six standard 3/8-in. locknuts engage 3/8 by 5/8-in. hexagon head cap screws to hold together the two dish-shaped sections of the drawn-steel wheel. Bolted together face to face, the two sections form the flat base rim on which the penumatic tire is installed.

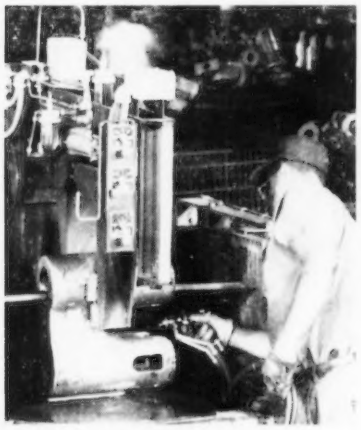
Made in 4 to 12-in. diam rim sizes, the pneumatic wheels support dynamic loads up to 4270 lb each, at speeds up to 50 mph.

Standard Pressed Steel Co., Jenkintown, Pa., produces the locknuts.

Firm Checks Fittings Under Black Light

Case fittings and return bends for refinery and chemical plant service are checked via a new inspection technique at one foundry. The process makes use of a special Magnaglo unit.

Developed for The Ohio Steel Foundry Co. by Magnaflux Corp. the setup is in use at their Springfield, Ohio, plant. The foundry uses it to surface inspect its castings on a production basis.



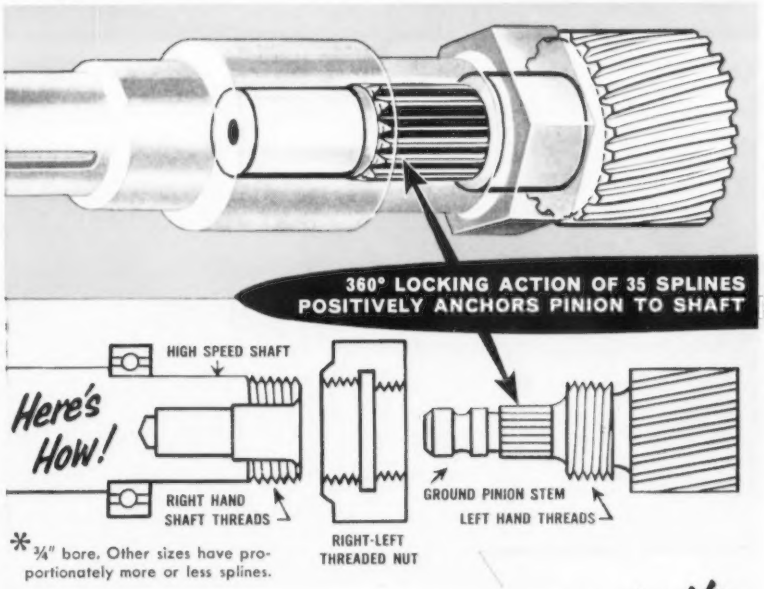
Worker sprays special solution on casting's surface.

Helps Inspectors—The process provides a number of advantages. It enables quality control inspec-

FOOTE BROS. SPLINE DRIVE PINION

Takes 35 "Bites" *

to guarantee better power transmission



* 3/4" bore. Other sizes have proportionately more or less splines.

SPLINE DRIVE PINION — *Standard In* GEARMOTORS AND LINE-O-POWER UNITS

advantages:

1. MORE LOCKING AREA

Self-broaching splines provide more internal locking surface than any other pinion . . . assure positive anchoring, even under reversing conditions.

2. GREATER STRENGTH

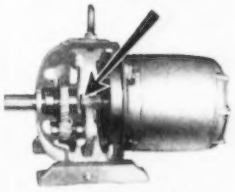
Gear and shank are machined from one piece. Solid construction and spline lock provide greater strength—no weakness due to projecting keyway.

3. PERMANENT ACCURATE ALIGNMENT

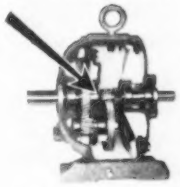
Self-centering action of ground pinion shank in the accurately bored high speed shaft assures accurate assembly and alignment for smoother performance.

4. DUTI-RATED GEARING

Foote Bros. Spline Drive Pinions have the famous Duti-Rated Gear—harder, tougher and more accurate, with greater load carrying capacity for their size than any other gearing.



GEARMOTOR



LINE-O-POWER UNIT

SPLINE DRIVE PINIONS are another example of Foote Bros. leadership . . . another reason you can be sure you're buying the finest when you buy Foote Bros. Power Transmission Equipment.

this trademark stands for the finest industrial gearing made

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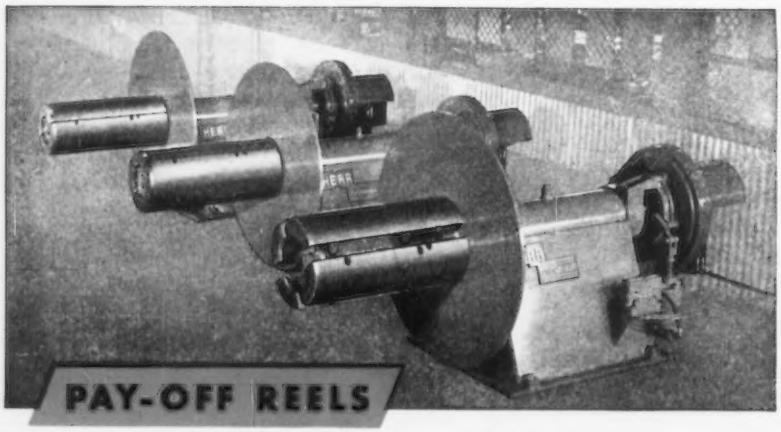
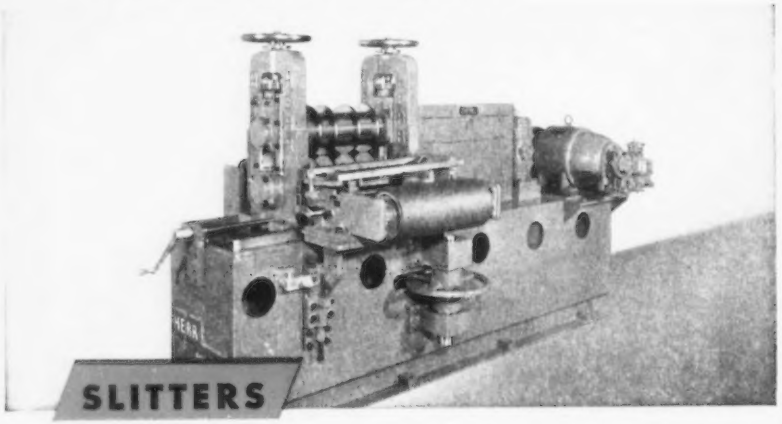


Types and sizes for coils weighing from 5,000 to 50,000 lbs. and up to 84" wide. Fixed, adjustable or automatically aligning bases. Timken bearings. Can be equipped with threading drive, also automatic speed compensating drive for feeding presses.



Built to insure dependable, high precision slitting. All thicknesses from .001 to ⅛", any commercial width. Quick, extremely accurate knife set-up. Also complete high precision slitting lines including pay-off reel, leveler, slitter, scrap winder, scrap chopper and coiling reel.

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THE HERR EQUIPMENT CORPORATION

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CLEVELAND, INDIANAPOLIS AND BERKELEY, CALIFORNIA

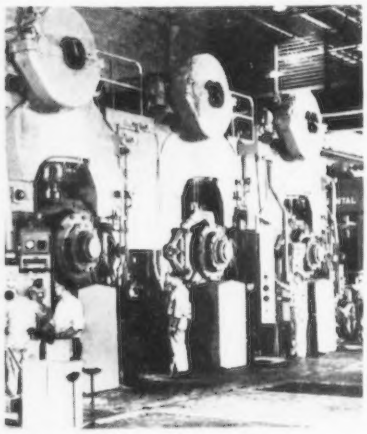
tors to view all exposed surfaces of a fitting or return bend. It reveals surface flaws that some other inspection methods might not show.

In preparing a casting for such inspection, an operator sprays all surfaces of the piece with a special solution. When the casting is examined under "black light," surface defects, readily show up.

New Steelmaking Setup Begins Operation

Steelmaking units two years in the building are now producing at Republic Steel Corp., Gladsen, Ala., plant. The new facilities include two large electric furnaces and a strip mill turning out hot-rolled, cold-rolled, and galvanized sheets and strip.

The furnaces, rated at 175 ton of steel per heat, produce a total of 408,000 ton of ingot steel annually. This increases the plant's capacity to 1,197,000 ton. Up to 30,000 ton



This tandem cold reducing mill rolls steel to 0.015-in. thick.

of finished product a month can be turned out by the new strip mill.

Strip mill equipment centers around a 54-in. hot-strip mill and a 54-in. three-stand tandem cold mill, designed to turn out finished product up to 48-in. wide; a 54-in. temper mill; a continuous pickle line which can handle 20-ton coils; a 48-in.

continuous galvanizing line; an annealing department; 48-in. cold-cutting and hot-cutting lines; and a multiple slitter for making narrow bands from coils.

Builds Big Evaporator For Aluminum Plant

Presently under construction for an aluminum processor is a giant evaporator with a 250,000 lb per hour rated capacity. Its vapor head alone is 22 ft in diameter. Swenson Evaporator Co., a division of Whiting Corp., Harvey, Ill., is manufacturing the equipment for Kaiser Engineers Div. of Henry J. Kaiser Co. It will be used to concentrate alumina liquor at the company's Fontana, Calif., plant.

This giant component is part of a 250,000 pph evaporator.

Speeds Pipe Joining

Now stainless steel piping can be welded quickly using a new aligning connector. It fits over ends of connecting sections permitting in-place pre-assembly of pipe and fittings.

These connectors are specially designed for use with lightwall stainless steel pipe, Schedules 5 and 10 and Speedline fittings. They also connect with conventional Schedule 40 systems.

Reduces Weight—One outstanding advantage of such connectors is this: lightwall piping setups need no threading at joints; excess pipe wall at joints thus is unnecessary.

Another asset, according to Speedline Div., Horace T. Potts Co., Philadelphia, is elimination of "icicles" inside connections. These impede fluid flow, cause turbulence.

Brazing Flux

A new high temperature flux is suitable for brazing steel, stainless steel, nickel alloys, high temperature alloys, copper, tungsten and chromium carbides with silver brazing alloys. It works with torch, induction, air-gas or furnace brazing. Fluidity temperature of the material is reached at 900°F and remains active up to 3000°F, according to its maker, American Products Corp., Chicago.

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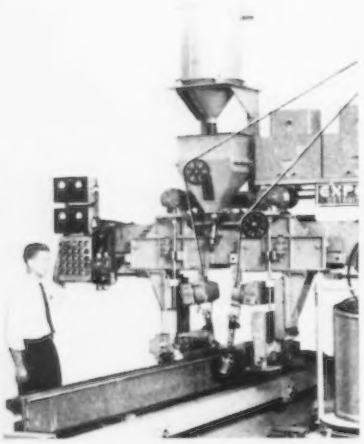
Equipment, Methods and Services



Twin-arc Unit Welds Both Sides of Big Parts

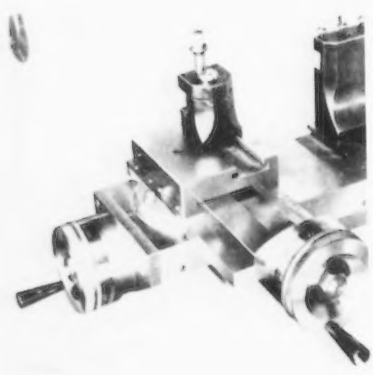
Automated for high-production use, this submerged twin-arc welding machine welds both sides of extra large parts. It performs four controlled reinforcement welding operations along the edges of both sides of long, hollow rectangular bulldozer push beams. These beams are 12-ft long, with an 8 x 8-in. cross section. However, the machine will take a wide variety of big production parts. Welding at an 80-ipm maximum rate, it works like this: A crane or other device loads the large, heavy beams on the machine's bed. An air-operated, toggle-type mechanism in the bed of the machine then lifts and squares the part. Two air-operated centering and clamping fixtures located on each end of the bed then center and clamp the part in position. Two thin-arc welding heads on a traveling beam apply and make the two welds; then it turns the part over for a similar operation. (Expert Welding Machine Co.)

For more data circle No. 37 on postcard, p. 169

Boiler Gage Is Readable Under Any Condition

Readable under all conditions, this steam boiler water-level gage cannot explode. It can be harnessed to operate controls automatically. Designed for use in powerplants and similar installations, particularly where steam pressures run in excess of 750 psi, it was originally constructed for the U. S. Navy. The instrument is similar to conventional gages in size and shape. However, instead of a glass or quartz tube, it consists of a non-magnetic stainless steel pipe enclosing a metal float which carrries a powerful permanent magnet. As the float rides up and down on the water in the tube, the magnet acts through the tube walls upon a row of metal rods mounted beside it. Painted white, each reed can be pulled forward by the magnet so that it comes into view through a window in front of the gage. When the float moves again, the reed recedes out of sight. (Charles Engelhard, Inc.)

For more data circle No. 38 on postcard, p. 169



Lathe Slide Rest Features Ease of Operation

This versatile lathe slide rest features a swivel slide which is graduated in degrees. It may be swung and used for turning operations on the lathe without interference between handles or slides. Its maker says the component combines tried and proven features of conventional slide rests with a new center-driven tool post slide and a new "open-side" tool post. These improvements provide ease of operation. The slide rest has the following dimensions and features: top slide travel is 4½ in.; tool bit size is ⅜ x ⅜ in.; hardened and ground screws of ½-in. diam are supported on ball bearings for effortless accuracy; the satin-chrome-finish dials are both direct reading. (Wade Tool Co.)

For more data circle No. 39 on potcard, p. 169

INVISIBLE LEAD

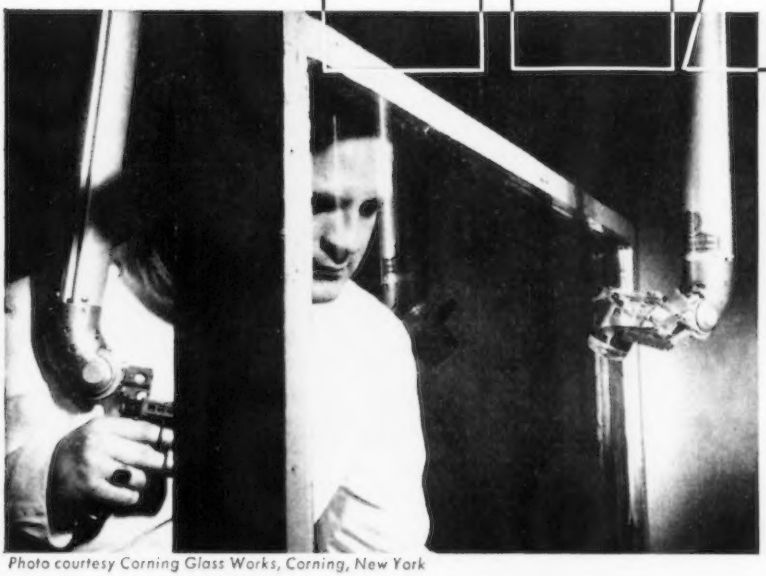


Photo courtesy Corning Glass Works, Corning, New York

...HE SEES, YET HE IS SAFE!

Construction of leaded glass windows recently installed at one of the leading nuclear laboratories.

Lead has long proved its protective value in the field of radioactivity. One of the first problems encountered was to protect the individual against the harmful effects of certain rays. This was accomplished by a *lead metal shield*. But as the field of nuclear activities broadened, it became imperative that operators be able to 'see' what was going on. To work the 'slave' would require visual as well as manual control.

Here, too, LEAD ENTERED THE PICTURE!

Heavily leaded glass is now being used for operational windows. Built of 10 inch thick blocks, such as shown above, these windows will run up to 60 inches thick, depending upon the degree of radioactivity and protection required. Made of the highest quality glass and with a transparency greater than that of the finest sun glasses, these windows provide the necessary high visibility while fully protecting personnel.

Lead, the oldest of metals, is the forefront of the newest in scientific developments: the creation, control and use of nuclear energy.

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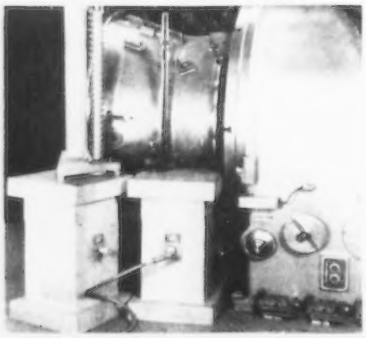
Truck Handles Cable Reels of Varying Sizes

An electrically powered walkie-type truck handles cable reels of varying sizes up to 20,000 lbs. Maximum cable reel diameter that can be accommodated is 90 in. The minimum it takes is 36 in. Maximum reel width is 68 in. No manual adjustments of the lifting hooks are required for the full range of diameters. Twin hydraulic cylinders, one attached to each lifting arm, are synchronized to lift simultaneously. Lifting and lowering controls, as well as brake, traction and horn controls, are located right in the handle head. An electric storage battery powers the unit, which is operated by walking along wtih it. (Lewis-Shepard Products, Inc.)

For more data circle No. 40 on postcard, p. 169



Granite Riser Blocks Have Air Lift Control

To get accurate height gage readings on parts with higher than normal check points, these granite riser blocks use an air lift device. This permits fingertip control of the 300-lb blocks. The riser blocks provide precision granite surfaces parallel to the working surface plate. They make possible use of standard height gages. This eliminates erroneous readings caused by vibration or chatter sometimes encountered with extra-length height gages. The air lift feature lets the operator guide the heavy block into position with merely the touch of a finger. As the block actually floats on a cushion of air there is no wear on the surface plate. (The Herman Stone Co.)

For more data circle No. 41 on postcard, p. 169

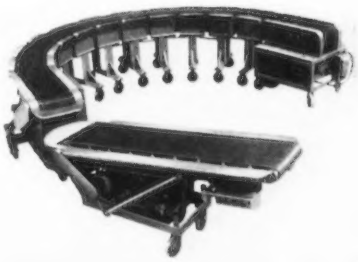
LOOK...NO HANDS!

Hydraulic Trim Presses Act At High Speeds

Fast-acting hydraulic presses in a just-introduced series use a new principle of teaming an accumulator with a closed shock-free, pressurized, hydraulic system. The high velocity trim presses achieve extremely rapid cycling action with relatively low horsepower input. Approach-speeds up to 2000-ipm ram travel give the unit's broad production capacities in many fields (i.e., diecasting, ceramics, metalworking, plastics, etc.). The new presses come in platen sizes of 15 x 18 up to 36 x 54 in., offering 12, 15 and 18-in. strokes, with shut-heights of 5, 10 and 15 in., in 13, 20, 30, 40 and 50-ton capacities, in either two or four-post types. Of highly rigid construction, these presses employ parallel strain rods with heavy-duty platen guide bearings to give a large, well supported working area and a versatility of tooling and die arrangement. (Bausenbach Hydraulics Div., Buffalo Metal Container Corp.)

For more data circle No. 42 on postcard, p. 169

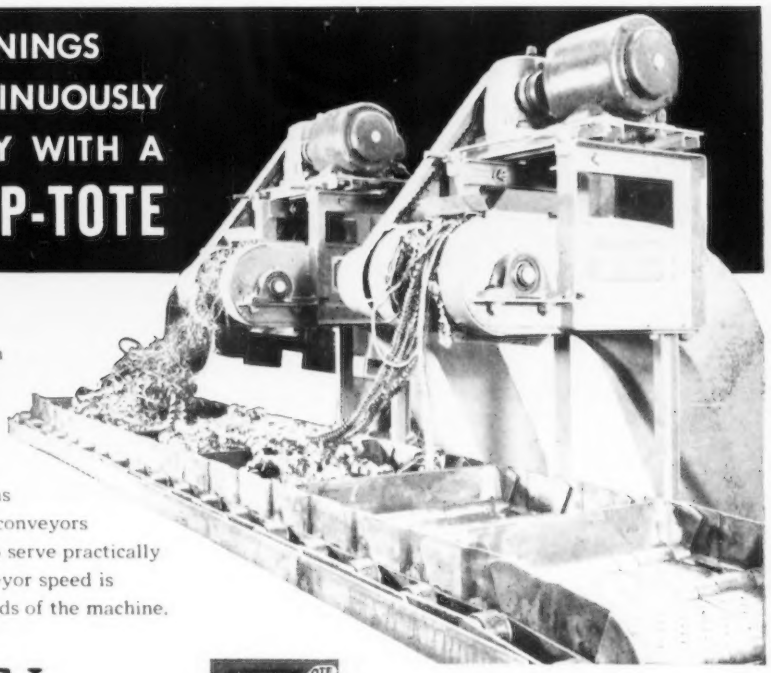
Conveyor Moves To Jobs, Bends Around Corners



Push-button controlled, a new electrically powered conveyor and stacker is highly portable. Primarily designed for easy, fast loading and unloading of box cars and highway trucks, it can fit into applications in warehouses and manufacturing. It bends horizontally in either direction to mechanically carry materials around stationary objects. Also, because it is easily moved from one location to another, the unit can frequently perform a variety of short run handling assignments. It includes a power stacker car, a belt drive car, a power traveler car, and center cars. (Jervis B. Webb Co.)

For more data circle No. 43 on postcard, p. 169

REMOVE CHIPS, TURNINGS AND BORINGS CONTINUOUSLY AND AUTOMATICALLY WITH A MAY-FRAN CHIP-TOTE



That's right! The May-Fran CHIP-TOTE permits the continuous operation of machine tools by eliminating down-time for scrap removal . . . skilled workers stay on the job . . . production increases by as much as 20%! Versatile CHIP-TOTE conveyors are available in a wide range of sizes to serve practically any type or size of machine tool. Conveyor speed is adjusted to meet the scrap removal needs of the machine.

MAY-FRAN ENGINEERING, INC.
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7721 MF

When welded aluminum must meet exacting standards...severe service

Photo Courtesy of Graver Tank and Mfg. Co., Inc.

WELD WITH ARCOS

ALUMINUM RODS and ELECTRODES

The inert-gas-shielded-arc process made aluminum welding practical . . . but it takes Arcos quality in aluminum bare wire to assure you the most dependable results possible. Because no flux is used, the chemical analysis and cleanliness of the wire must be within exacting limits. Arcos' long experience with weld metallurgy, plus rigid controls in manufacturing, guarantee this vital factor. Arcos aluminum wire is your best assurance of stronger, more ductile, more corrosion-resistant welds.

ARCOS CORPORATION, 1500 S. 50th St., Philadelphia 43, Pa.

NEW EQUIPMENT

Roy Screw Slotter

This slotting machine handles screw blanks from No. 2 to 5/16-in. nominal up to 2½-in. long. A complete changeover from one screw size to another can be made in approximately 15 minutes. The machine has a new variable speed rotary hopper designed for more efficient and trouble-free feeding. The hopper is enclosed with spill-proof guards to insure against loss of blanks. Deburring costs are down due to a new rotating mechanism which employs replaceable high-speed steel inserts. A separate cooling system with an independent motorized pump is incorporated in the machine. (Roy Machinery & Sales, Inc.)

For more data circle No. 44 on postcard, p. 169

Sling Chains

Due to complex production requirements, maintenance functions, etc., have you ever needed a sling chain assembly in a hurry to maintain plant capacity? Under normal conditions, the sling chain would probably be delivered, after its fabrication, some 1 to 2 weeks later, depending upon your plant's location. To overcome these long and costly delays, one chain maker has developed a new sling chain. With this, there is no longer any need to tie up men in order to fabricate a makeshift sling for the interim

period. Waiting periods for shipments from a supplier and returning of damaged slings for repairs are entirely eliminated, the firm says. The sling chain assemblies come in single and double leg styles and in six chain sizes from ¼ through ⅞ in. (American Chain & Cable Co., Inc.)

For more data circle No. 45 on postcard, p. 169

Cutting Tools

Special cutting tools just announced have a matched holder and cutter shank design which assures strength and rigidity. Based on the clutch drive principle, these tools feature a "taper-torque" drive which provides great load carrying capacity. Strong, on-center drive lugs provide equal distribution of the radial driving force between holder and tool. Greater rigidity achieved with the design reduces tool chatter and permits a smooth flow of power, even on rough, interrupted surfaces. The tools and holders are made to order for special tooling. Five sizes of holders will accommodate cutters from ¾ through 3⅜ in. OD. They are available in any grade of high speed tool steel and can be tipped with carbide. (Metal Cutting Tools, Inc.)

For more data circle No. 46 on postcard, p. 169

Contour Cutters

A new line of cutters produce port contours in steels, including stainless. Heretofore, AND 10050 contour cutters have been used extensively with nonferrous materials. However, increasing use of stainless and other high tensile strength

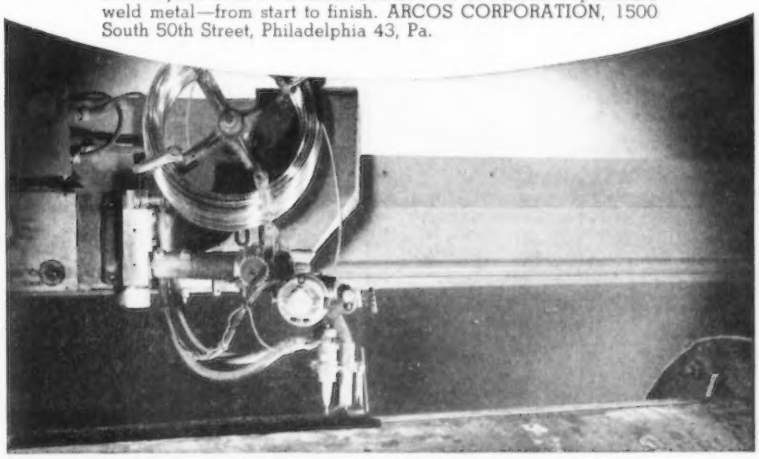
More proof . . . how to get consistent results from submerged arc welding

Courtesy of CF Braun & Co
Engineers and Constructors, Alhambra, California

WELD WITH ARCOS

STAINLESS COILED WIRE

Unfailing strength and resistance to corrosion at elevated temperatures are vital in the welds of this massive 14 ft. diameter, 30 ft. long catalyst pressure vessel. All seam welding of the 1¼ Chrome ½% Moly plate was submerged arc welded with Arcos Chromar *welding quality* wire. Arcos Chromar wire—like every Arcos filler metal product—can be used with confidence on the most critical jobs. Start with Arcos and be sure of uniform dependable weld metal—from start to finish. ARCOS CORPORATION, 1500 South 50th Street, Philadelphia 43, Pa.



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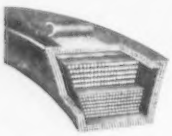
America's Quality Pillow Blocks!



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DODGE
of Mishawaka, Ind.

NEW EQUIPMENT

materials in hydraulic systems calls for a more rugged cutter. So, here they are. The cutters produce the AND 10050 contour in a single pass; when a reamer pilot is used, they also size the minor diameter of Class-3 thread specifications.

Shank and body of the new tool are of hardened alloy steel. Cutting edges are tipped with tungsten carbide. The cutters come in thirteen diameters for all sizes of fittings used with ⅛ through 2-in. diam tubing. (Sonnet Tool & Mfg. Co.)

For more data circle No. 47 on postcard, p. 169

Plastic Window

Easy-to-install, a new metal and plastic window requires almost no maintenance. Pre-assembled with panes of shatterproof translucent glass fiber reinforced plastic in aluminum or steel frames, they also come in pivoted or projected units. The new lightweight windows pass almost as much light as clear glass —a soft, diffused light that eliminates glare. (Resolite Corp.)

For more data circle No. 48 on postcard, p. 169

Drill Bushings

Drill bushings for laminated plastic drill tools permit secure press-fit installation after the laminating process is complete. In one quick action the bushing is squeezed into the drilled hole location until the shank end is seated on a stationary flaring tool placed underneath. (Techno-Products Corp.)

For more data circle No. 49 on postcard, p. 169

Motor-driven Crane

Rugged and of comparative low cost, a new motor-driven crane has machined wheels. Each of these is fitted with pre-lubricated precision ball bearings. All gears have cut spur teeth and the motor, which is specially built for crane service, drives the crane at 60 fpm. Bridge beams are standard I-beam sections. The standard unit is furnished with rope control, but magnetic push button control, runway collectors and bracket and bridge conductor are available. It comes in 1, 2 and 3-ton capacities, up to 30-ft spans. (Bacon Crane & Hoist Corp.)

For more data circle No. 50 on postcard, p. 169

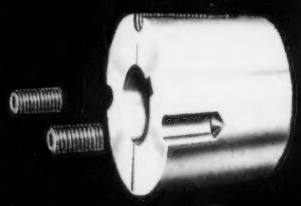
Vacuum Cleaner

Designed for big volume pick-up of either wet or dry materials, this power head adaptor unit converts any 30 or 55 gal drum to a high-powered suction machine for pick up of oils, dust, grain, water, metal or wood chips, shavings, etc. The large capacity eliminates the need for frequent emptying. It is equipped

with a 1-hp moisture and dust-proof motor. A three-stage fan provides high suction. The sealed vacuum system develops a 78-in. water lift. Hoses and fittings are available with either a 1½ or 2-in. orifice. The 2-in. hose and fittings make possible pick-up of larger objects. An automatic shut-off prevents accidental overflow of liquids. Suction automatically stops when the drum is filled. The machine is also equipped with a blower that can be used to blow dust and chips out of motors, lathes, etc. Its power head easily lifts off and transfers from one drum

IT'S TAPER-LOCK

—IT'S INTERCHANGEABLE!



TAPER-LOCK SHEAVES

TAPER-LOCK SPROCKETS

TAPER-LOCK COUPLINGS
Rigid—Flexible—Chain

TAPER-LOCK STEEL CONVEYOR PULLEYS

The New Way to Cut Costs

Save time in mounting. Cut down-time on production machines. Standardize with Taper-Lock, the *interchangeable* bushing. The same Taper-Lock bushing fits sheaves, sprockets, couplings, conveyor pulleys. That means smaller inventories of power transmission parts. And it means quicker changes when necessary to keep production lines running!

Taper-Lock bushings are available in a range of sizes which makes it easy to change from one size shaft to another. Taper-Lock products slip onto the shaft quickly — hold with the firmness of a shrunk-on fit—come off easily, without shock to bearings or machinery. You'll profit by standardizing on Taper-Lock.

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Nine coated electrode specifications cover just about every requirement for manual arc welding mild steel. How to select electrodes for various positions and types of work.

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Official steel ingot capacities as of Jan. 1, 1957, by Iron Age districts. Capacities by companies and by types. Also pig iron and coke capacities by companies.

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To cut costs, take a close look at your inspection and in-plant scrap control systems. Special survey report shows how many companies handle this important job.

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Here is industry's latest thinking on how to pay executives to cut down turnover, attract good management men. A survey report shows pay of top management, middle management, going prices for engineers and other executives. What companies are doing about pension and bonus plans.

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More For Your Machining Dollar

Tips on machining stainless steel: turning, drilling, milling, tapping, threading, broaching and reaming. Cutting speeds and feeds for standard tools on standard carbon steels.

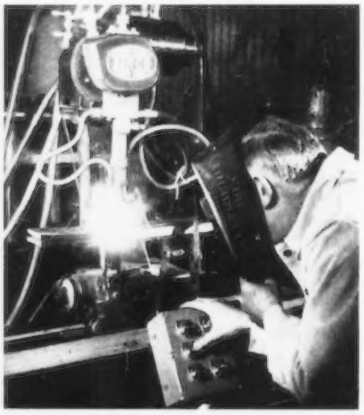
sixteen pages 25¢

to another. A dolly is available for transporting the machine. (Advance Floor Machine Co.)

For more data circle No. 51 on postcard, p. 169

Welder Head

This heavy-duty welding machine head is specifically designed for production applications of automatic machine welding. Key features of the unit include a capacity for heavy welding wires. Aluminum wires of from 3/64 to ⅛ in. and hard wires from 0.045 to ⅛ in. can be fed at any rate up to 600 ipm. Wire feed speed is fully adjustable by



means of a calibrated governor which regulates the ⅓-hp wire-drive motor. The machine barrel is rated at 600 amp, on a 100 pct duty cycle. The welding head rotates through 360°. It works with an inert-gas-shielded metal-arc welding system in which spooled welding wire, the consumable electrode, is automatically fed into the weld pool. (Air Reduction Co.)

For more data circle No. 52 on postcard, p. 169

Tapper, Deburrer

The problem of removing burrs from the tops of Heli-Coil tapped holes no longer exists. Credit for its disappearance goes to a new device especially designed for use with Heli-Coil taps. This tool taps and de-burrs in one operation by simply slipping the deburring bit over a two or four-fluted tap.

While the tap is withdrawn from the workpiece, the bit starts to operate, leaving the top of the hole perfectly smooth and clean for easy Heli-Coil insertion. The device works in conjunction with conventional type tapping machines or with tapping heads. Available in sizes No. 4 (0.04CSB) to ⅜ in. (20145-6), it's made of fine grade, high speed tool steel. (Vernon Devices, Inc.)

For more data circle No. 53 on postcard, p. 169

Battery Chargers

Two new single-phase, constant dc-voltage silicon rectifier battery chargers eliminate need for special industrial wiring. The chargers let users take advantage of the latest material handling methods without having to rewire their electrical power facilities. These compact chargers plug into any standard 15-amp, 115-v convenience outlet from which, in the smaller size, they will charge any 6-cell lead-acid battery up to 480 amp hour capacity; and, in the larger size, any 6-cell lead-acid battery up to 660 amp hour capacity in 16 hours or less. (C & D Batteries, Inc.)

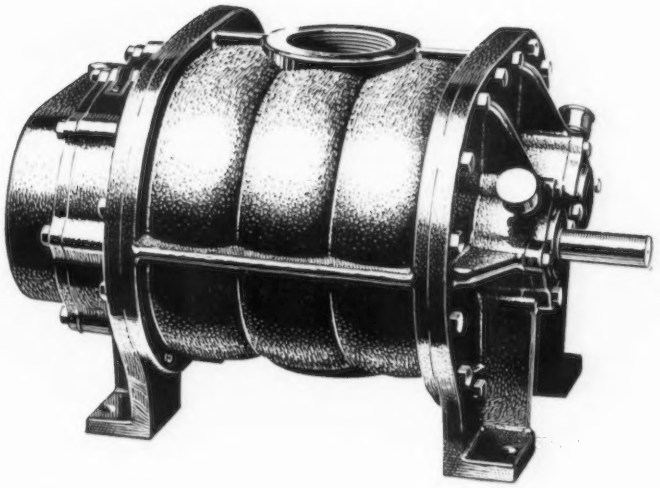
For more data circle No. 54 on postcard, p. 169

Valves

Featuring leak-proof construction, a complete line of knob-controlled panel-mounted valves work to 200 psi in pneumatic and hydraulic or vacuum service. The

valves also boast unrestricted flow capacity, simplified mounting and safe operation. They come in 2, 3 and 4-way types, in sizes from ¼ through ¾ in. NPT, fitted for manual or spring return. (Valvair Corp.)

For more data circle No. 55 on postcard, p. 169



R-C rotary positive blowers deliver clean air in large or small volumes

Whether you require 5 or 100,000 cfm of accurately controlled volumes of air, Roots-Connersville rotary positive blowers assure performance that meets the most exacting specifications.

- No internal lubrication . . . air is free of oil vapors or moisture.
- High volumetric efficiency maintained with negligible slippage and with constant volumes delivered regardless of pressure.
- Impellers make no internal contact keeping friction loss small.
- Higher operating speeds result in reduced first cost, less weight and floor space. Horsepower is determined by operating pressure, resulting in maximum power savings.
- Drives may be direct-connected to electric motors, turbines, steam or gas engines . . . or speed reducing gears or V-belts.

In chemical, waste treatment, refining, paper and many other industries, R-C blowers have earned outstanding acceptance. R-C application engineers will welcome the opportunity to help solve your problem, large or small. Write for Bulletins AF-154 on small blowers or RB-154 on large units.

Engineers—unusual career opportunities await you at Roots-Connersville. Address your resume to Professional Employment Manager.

ROOTS-CONNERSVILLE BLOWER

A DIVISION OF DRESSER INDUSTRIES, INC.

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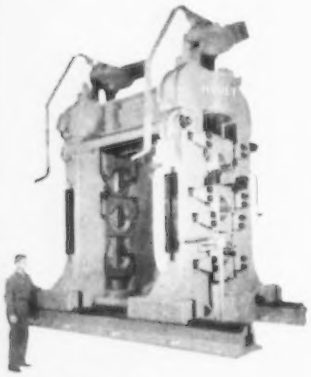
Hyde Park

RED CIRCLE Rolls ALLOY-CHILLED

Rolling Mill Equipment

Outstanding in quality and in performance Hyde Park Rolling Mill Equipment has enjoyed the respect of the industry for more than fifty years.



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Merchant Mills
Sheet and Strip Mills
Pinion Stands
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Special Machinery
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Hyde Park

FOUNDRY & MACHINE CO.
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ROLLS
ROLLING MILL MACHINERY
GREY IRON CASTINGS

FREE TECHNICAL LITERATURE

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 169.

Pins, Bushings

Die set pins and bushings are listed in an 8-page catalog. (E. W. Bliss Co.)

For free copy circle No. 1 on postcard, p. 169

Microradiography

Principles of microradiography are reviewed in a 48-page book. It includes a bibliography prepared by Eastman Kodak Research Laboratories on the subject of microradiography and soft X-ray radiography. (Instruments Div., Philips Electronics, Inc.)

For free copy circle No. 2 on postcard, p. 169

Hydraulic Power

Hydraulic power packs now available simultaneously operate up to four fastener installation tools. (Huck Mfg. Co.)

For free copy circle No. 3 on postcard, p. 169

Barrel Finishing

One piece of equipment that does many jobs of barrel finishing and deburring is introduced in a company's catalog sheet. The multi-use barrel comes in sizes ranging up to 120-in. ID. For large loads it may be used as: (1) a single cavity barrel, (2) six or more separate divisions each holding a different job and/or using another type of media, (3) with a custom-designed holding fixture it finishes parts to 118-in. long. Any of these changes can be made with little effort in a matter of minutes. (Speed-D-Burr Corp.)

For free copy circle No. 4 on postcard, p. 169

Rolled Alloys

A distributor of heat and corrosion resistant alloys is releasing a temperature range chart covering 1000 to 2100°F. In addition to the temperature range of alloys, the chart indicates the usefulness as to carburizing and/or nitriding, reducing atmospheres and oxidation. (Rolled Alloys, Inc.)

For free copy circle No. 5 on postcard, p. 169

Air, Hydro Cylinders

Air and hydraulic cylinders are covered in a dozen-page catalog. In includes information on five types in sizes 1 to 10 in. (Petch Mfg. Co.)

For free copy circle No. 6 on postcard, p. 169

Automated Unit

A firm's literature describes a new automotive rear axle housing machine. This 13-station, production giant performs 46 operations. And, it completes all 46 operations every 26 seconds. (La-Salle Tool, Inc.)

For free copy circle No. 7 on postcard, p. 169

Speed Variators

Speed variators are shown in a 16-page bulletin. It describes packaged direct-current adjustable speed drives available from 3 through 150 hp. Illustrated are

220, 440, 550 v, 3-phase ac 60-cycle models. (General Electric Co.)

For free copy circle No. 8 on postcard, p. 169

Water Softeners

A 24-page bulletin deals with hot process softeners. Among other information contained in this bulletin is a section on the conditions of water that make treatment necessary. (Cochrane Corp.)

For free copy circle No. 9 on postcard, p. 169

Nibbler

Air powered and electric nibblers are presented in a 4-page folder. These 12-lb tools cut to 3/16 in. of copper, brass, aluminum, 10 gage stainless, 8 gage mild steel without distortion. (Fenway Machine Co., Inc.)

For free copy circle No. 10 on postcard, p. 169

Drill, Tap Setup

Featuring 12 speeds, a new auto-indexing turret drill and tap machine has a 3/16 in. capacity. A data sheet describes it. (Burgmaster Corp.)

For free copy circle No. 11 on postcard, p. 169

Chairs, Stools

Chairs and stools with tubular steel bases are subjects of a bulletin. It shows many models which instantly adjust to fit any size worker. (Adjusto Equipment Co.)

For free copy circle No. 12 on postcard, p. 169

Arc Welders

In 24 pages, a catalog supplies data on arc welders. It lists many different units and describes them, including: electric drive welders, gas engine drive units, transformer-rectifier models, induction heaters, automatic welders, cutting equipment, self-propelled setups, etc. (Hobart Bros. Co.)

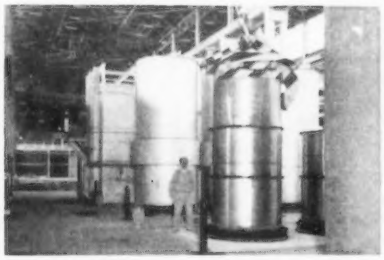
For free copy circle No. 13 on postcard, p. 169

Grinders, Polishers

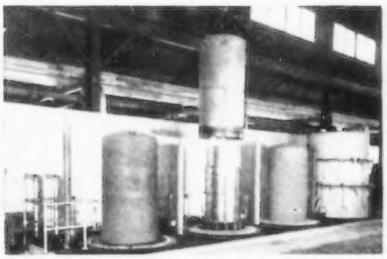
Grinders, buffers and polishers are illustrated and described in a 6-page folder. Also shown are combination grinder - buffers and

Bell Type FURNACES

Built to Suit Your Plant, Product or Process



Part of an installation of large gas fired three-stack rectangular bell type forced circulation special atmosphere furnaces for annealing strip.



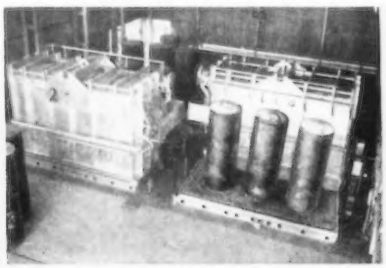
Built right—over 20 years ago—this EF installation is still in operation, daily—and producing first class work.

Single or multi-stack—circular, rectangular or square types—upright, elevator or partial pits—gas fired, oil fired or electric—correctly designed, built and installed, ready to produce.

Backed by over 40 years of practical furnace building experience, EF furnaces incorporate all the advantages of all bell type designs, for processing strip, wire, rod and other ferrous and non-ferrous products.

EF bell type furnaces installed over 20 years ago are still in service daily, producing first class work. There's no substitute for experience.

Part of another installation of large EF gas fired three-stack rectangular bell type forced circulation special atmosphere furnaces for annealing steel strip.



EF gas fired special atmosphere rectangular bell type strip annealers with individually controlled forced circulation three-stack bases each with capacity of 135,000 lbs. per charge.

Submit your production furnace problems to experienced EF engineers—it pays.

BULLETIN No. 461

shows typical installations of EF Gas-fired, Oil-fired and Electric Furnaces.

Send for a copy today!

THE ELECTRIC FURNACE CO.

GAS-FIRED OIL-FIRED AND ELECTRIC FURNACES FOR ANY PROCESS, PRODUCT OR PRODUCTION *Salem - Ohio*

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"TWO PRESSES IN ONE"

REPORTS STEWART-WARNER CORP., CHICAGO, ILL.

Die Cushion is automatically positioned

K. R. WILSON FOUR-COLUMN PRESS

Model No. 100SE 4840

"GIVES US PRECISION ACCURACY FOR DIE-TRYOUT . . . SPEED AND VERSATILITY FOR SHORT PRODUCTION RUNS."

The new K. R. Wilson Four-Column, Down Acting Press recently delivered to Stewart-Warner Corp. does "double duty" in their Chicago plant. The 100 ton capacity press features an automatically-positioned pneumatic die cushion. With the cushion in position, the press can be used both for die-tryout and for production runs utilizing forming or drawing dies. When the cushion is retracted, spring loaded dies can be used. With the air evacuated from the cushion, the press can be used for blanking. With such operational flexibility, and rapid conversion features, the K. R. Wilson Model No. 100SE-4840 Press can be kept in nearly continuous operation. Get all the facts now on this time-saving, money-making press.

SPECIFICATIONS:

DIE CUSHION Capacity—tons	22.6
DAYLIGHT — in/max.	24
RAM STROKE — in	18
RAM SPEEDS — in/min:	
Approach	160
Pressing	29
Return	250
CONTROLS — Electric Push Button	
20 H.P. UNIT	

HYDRAULICS DIVISION

K. R. WILSON, Inc.

OFFICES & FACTORIES — 208 MAIN ST., ARCADE, N. Y., U. S. A.

FREE LITERATURE

dust collectors. Units come in belted and direct motor drive, ¼ to 100 hp. (The Standard Electrical Tool Co.)

For free copy circle No. 14 on postcard, p. 169

Heating Elements

Rugged long-life cast heating elements for electric furnaces have several advantages. A 4-page brochure presents these. The ruggedly built elements have high strength at operating temperatures over a wide range. (The Electric Furnace Co.)

For free copy circle No. 15 on postcard, p. 169

Industrial Ovens

Infra-red drying and baking ovens are covered in an 8-page bulletin. It reviews advantages and applications of new ceramic type infra-red generators. These versatile, interlocking assemblies come as complete ovens for individual replacement of bulb units. (Dri Clime Lamp Corp.)

For free copy circle No. 16 on postcard, p. 169

Cutting-off Units

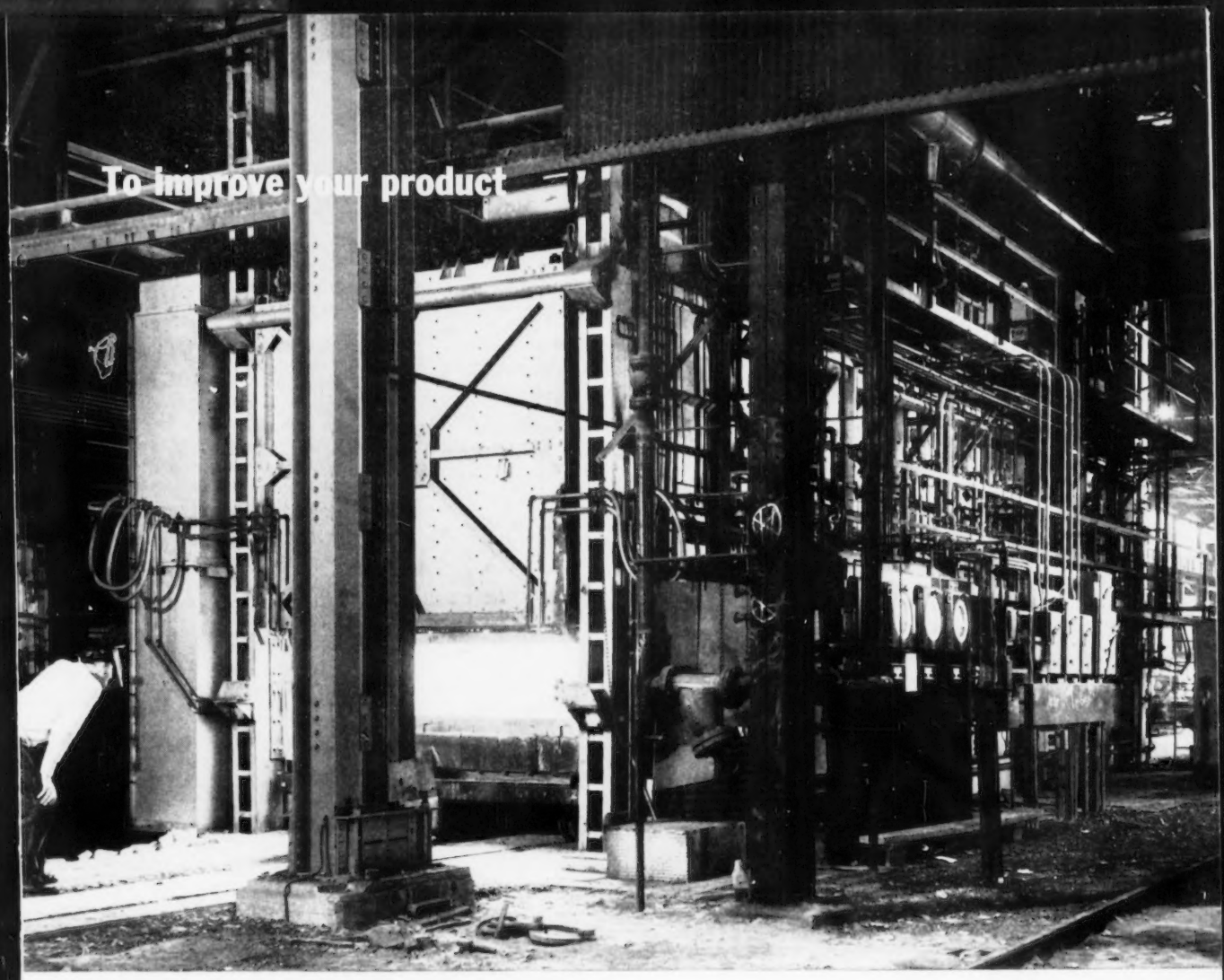
Cutting-off machines are featured in a catalog. Its four pages also cover automatic loaders, hot spinning machines and safety drill tables. The publication describes units that efficiently and quickly cut-off tubing, pipe and bar stock up to 8 in. OD. (Modern Machine Tool Co.)

For free copy circle No. 17 on postcard, p. 169

Hydrogen Analyzer

Techniques for gravimetric determination of hydrogen in titanium, zirconium and metal hydrides are described in a manual. It talks about a hydrogen analyzer which is inexpensive to operate. Samples can be loaded and analyzed one at a time, with no vacuum seal to open or system to evacuate. (Laboratory Equipment Corp.)

For free copy circle No. 18 on postcard, p. 169



EXACT TEMPERATURE FOR ALCO FORGINGS

New furnaces for ALCO open-die and circular forgings use automatic heat-zone control for better quality of end product

New furnaces are part of ALCO's drive for top quality in open-die and circular forgings. The furnaces, like the car-bottom furnace above, are zoned, and each zone is automatically controlled to the proper heat level. This means that each ingot or billet reaches the forging press at the right temperature for planned reduction, and it also means that ALCO heat treatment is exact and thorough, assuring the best physical properties for the intended application.

Quality and leadership like this are in every step of production of an ALCO forging. They save you money. If you do extensive machining on open-die or circular forgings, Hi-Qua-Led Steel®, which only ALCO offers, can cut your costs up to 50 per cent.

ALCO forgings are available to 40 ft and 30,000 lb in the open-die type, and from 15 to 145 in. OD for circular forgings. For specific information contact the nearest ALCO sales office, or for new full-color brochure write Spring & Forge Division, Dept. OCF-6, P. O. Box 1065, Schenectady 1, New York.

ALCO

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(Advertisement)

Special Reports On Finishing Non-Ferrous Metals

NUMBER II—Paint Base, Corrosion-Resistant Finishing with Iridite

WHAT IS IRIDITE®?

Briefly, Iridite is the tradename for a specialized line of chromate conversion finishes. They are generally applied by dip, some by brush or spray, at or near room temperature, with automatic equipment or manual finishing facilities. During application, a chemical reaction occurs that produces a thin (.00002" max.) gel-like, complex chromate film of a non-porous nature on the surface of the metal. This film is an integral part of the metal itself, thus cannot flake, chip or peel. No special equipment, exhaust systems or specially trained personnel are required.

Chromate conversion coatings are well known and accepted throughout industry as an economical means of providing corrosion protection, a good paint base and decorative finishes for non-ferrous metals. However, continued developments have been so rapid and widespread that many manufacturers may not be completely aware of the breadth of application of this type of finish. Hence, this digest of current information; to bring you up to date on the many ways in which you can obtain proper surface preparation for painting and increase product durability with a single multi-purpose chemical pretreatment. Report I on decorative, corrosion-resistant finishes and Report III on chemically polished, corrosion-resistant finishes are available on request.

First, it is an accepted fact that metal surfaces should be prepared before painting to make possible an efficient paint system. Naturally, this preparation should provide for good initial paint adhesion. Chemical treatments have proved extremely effective in this respect, particularly those of a neutral or preferably acid nature. Further, to be most efficient, chemical treatments should provide a non-porous barrier to maintain adhesion by sealing the metal from the paint and moisture. They should also provide a self-healing film which prevents lateral corrosion in the event that bare metal is exposed through scratching.

The Iridite chromate conversion coatings meet all these requirements. Iridite is a chemical conversion treatment for surface preparation. It provides initial paint bonding by molecular adhesion. It is acid in nature and produces a film that is gel-like and non-porous in structure. Thus, the Iridite film effectively seals the metal from the paint and from moisture penetration. Because the film contains certain relatively soluble constituents, it will protect areas scratched through to bare metal and prevent lateral corrosion. This is accomplished by a gradual leaching of these constituents into the damaged area.

Further, because of its gel-like, non-crystalline nature, the Iridite film will not affect the appearance or texture of the paint film, nor will it dust or powder to mar the painted surface. Because the film is non-porous, paint coverage is increased, thus substantial savings in paint costs will be realized. In addition, treated parts may be stored for long periods of time prior to painting without the risk of entrapped moisture causing blistering when painting.

Iridite chromate conversion coatings are widely used with equal ease and success under both baked and air-dried paint systems. While the actual adherence properties of the Iridite film do not increase appreciably with its thickness, corrosion protection does. The protection of the Iridite film is proportionate to its thickness and should be taken into consideration when selecting the Iridite to meet your needs. However, it is sometimes necessary to sacrifice maximum corrosion protection for appearance when a finished part is to be only partially painted. For example, it may be desirable to use a thin, clear, bright Iridite film if the unpainted areas must present a chrome-like appearance. A typical case is that of instrument housings on which the exterior is painted and the inside left unpainted.

On the other hand, if all surfaces of the product are to be painted and maximum corrosion protection is required, the heavier and most protective Iridite films should be used. For example, all surfaces of zinc die cast fruit juicers are finished with a highly protective Iridite film prior to painting to provide maximum resistance to the corrosive action of fruit juices.

Iridite finishes are now available for all commercial forms of the more commonly used non-ferrous metals, including zinc, cadmium, aluminum, magnesium, silver, copper, brass and bronze. In addition to providing an excellent base for paint, the Iridite films also have high decorative value when used as final finishes in themselves.

These films can produce a wide variety of pleasing appearances including clear bright, iridescent yellow, bronze, olive drab and brown. In addition, many films can be modified by bleaching or by dyeing. Among the dye colors available are various shades of red, yellow, green, blue or black.

In planning or designing, you should consider the many other characteristics of Iridite finishes which may enter into the specific problem. In addition to their functions as protective and decorative finishes, and as bases for organic finishes and bonding compounds, Iridites have low electrical resistance. Some can be soldered and welded. The film does not affect the dimensional stability of close tolerance parts.

Iridites are widely approved under both Armed Services and industrial specifications because of performance, low cost and savings of materials and equipment.

You can see then, that with the many factors to be considered, selection of the Iridite best suited to your product requires the services of a specialist. That's why Allied maintains a staff of competent Field Engineers—to help you select the Iridite to make your installation most efficient in improving the quality of your product. You'll find your Allied Field Engineer listed under "Plating Supplies" in your classified telephone book. Or, write direct and tell us your problem. Complete literature and data, as well as sample part processing, is available. Allied Research Products, Inc., 4004-06 East Monument Street, Baltimore 5, Maryland.

FREE LITERATURE

Continued

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Turret Punch Presses

How turret punch presses cut your short-run piercing costs 60 to 90 pct is told in a 4-page folder. It explains how these versatile punching units: (1) eliminate setup; (2) eliminate layout; (3) give maximum flexibility; (4) provide for unlimited engineering changes; (5) have wide application. In one machine, they combine speed of a punch press, turrets carrying 12 to 32 punches and dies, and a quick-setting mechanical work positioning gage. (Wiedemann Machine Co.)

For free copy circle No. 19 on postcard

Quick-release Pins

Positive locking pins for quick-release are described in a 4-page bulletin. These pins quickly, safely lock 70,000 lb of high performance aircraft into position for safe towing. (D. W. Price Corp.)

For free copy circle No. 20 on postcard

Spindle Couplings

Spindle couplings for rolling mills are covered in a catalog. It details development, production and application of one maker's dihedral spindle couplings for roller drives. (Ajax Flexible Coupling Co., Inc.)

For free copy circle No. 21 on postcard

Rubber Armor

A catalog sheet describes how Goodrich Armorite can act as a liner, curtain, throw mat or pad for protection against abrasives. It explains why the material outwears steel 10 to 1 in some applications on such installations as (1) chutes, hoppers and other wearing surfaces handling ore, sand or gravel; (2) sandblast cabinets; (3) flotation cells; (4) dredge pump liners; and (5) cyclone collectors and fan housing for abrasive dusts. (B. F. Goodrich Industrial Products Co.)

For free copy circle No. 22 on postcard

Materials Handling

Materials handling operations and equipment are described in a company publication. Each article in it compares "old" vs. "new" handling techniques employed by companies in various industries. In each case, it gives specific cost-cutting advantages derived by these companies through conversion to improved handling methods. (Towmotor Corp.)

For free copy circle No. 23 on postcard

Sling Chains

Concise yet comprehensive, a 4-page bulletin analyzes properties and capabilities of registered sling chains. Featured is a listing of seven main points to consider when ordering sling chains. (American Chain & Cable Co., Inc.)

For free copy circle No. 24 on postcard

Shell Cores

Using an accurate shell core in making a 26 x 26-in. stainless casting eliminates subsequent machining for one inch. A 4-page bulletin diagrams the shell core, mold and finished part. It gives a complete description of problems encountered and how they were overcome. (Cooper Alloy Corp.)

For free copy circle No. 25 on postcard

Films and Booklets

Now available is a publication and audio visual list covering various applications of industrial gases, welding, cutting techniques and equipment. It lists films, slides, booklets, etc. (Air Reduction Sales Co.)

For free copy circle No. 26 on postcard

Slotted Angle

A booklet explains a high-speed framing system for building repeat-

Postcard valid 8 weeks only. After that use own letterhead fully describing items wanted. 12/12/57

Circle numbers for Free Technical Literature or Information on New Equipment:

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FREE LITERATURE

ing pattern structures with steel slotted angle stock. It's especially recommended for shelving, racks, tables and similar structures. (Acme Steel Co.)

For free copy circle No. 27 on postcard

Motor Controls

High-voltage, current limiting, fused starters for co-ordinated control of squirrel-cage and other motors are described in a brochure. In 12 pages, it covers applications, engineering features, simplified maintenance procedures, and components of new 30-in. deep control panel. (General Electric Co.)

For free copy circle No. 28 on postcard

Openhearth Recorders

Concise information about "prepackaged" equipment for recording O_2 in the openhearth, as a guide to improved combustion practice, is presented in a 4-page data sheet. (Leeds & Northrup Co.)

For free copy circle No. 29 on postcard

Aluminum Tanks

Aluminum's use for tanks and vessels is discussed in a booklet. It lists some more than 100 general types of chemicals which aluminum contains very well. (Reynolds Metals Co.)

For free copy circle No. 30 on postcard

Motor Control

Front access, high voltage starters for 2300- to 5000-v motors are described in a bulletin. It points out how the starter's roll-out type air-break contractor makes inspection and routine maintenance of the unit easy. (Allis-Chalmers Mfg. Co.)

For free copy circle No. 31 on postcard

Lubricating Unit

A 2-page bulletin gives data on a lubricator actuated by a machine's hydraulic cycle. This lubrication unit is for applications where desired oil discharge per machine cycle is relatively small. Fully automatic, the pump operates on any hydraulic line pressure from 500 to 3000 psi. (Bijur Lubricating Corp.)

For free copy circle No. 32 on postcard

Luminous Signs

Radium dials, panels and nameplates are listed and discussed in a 6-page folder. Prepared for design, engineering, purchasing and standards personnel, it groups data for guidance in selecting luminous materials. (For free copy, write on company letterhead to United States Radium Corp., Morristown, N. J., for Bulletin 10.30.)

Rivet Heater

An electric rivet heater is introduced in a 4-page bulletin as giving better work for less money. It explains reasons for their economy, convenience, and clean, modern ways. (Frank C. Cheston Co.)

For free copy circle No. 33 on postcard

Turning Roll

Featuring a variety of tank turning rolls, pipe rolls and rail cars for positioning cylindrical vessels for automatic welding is a new 12-page bulletin. It offers diameter settings, speeds, tire sizes and "tractive pull" ratings for unbalanced vessels. Rolls handle vessels to 600 tons in any lengths. (Aronson Machine Co.)

For free copy circle No. 34 on postcard

Fasteners

Fasteners for metal-to-metal and wood-to-metal jobs are dealt with in a 12-page brochure. It gives complete nomenclature on the fasteners. (Huck Mfg. Co.)

For free copy circle No. 35 on postcard

Adhesive Bonding

New machines (from two-station stationary models to 30-station rotary models) for assembling parts of various materials by adhesive bonding are described in a six-page bulletin. (Modern Industrial Engineering Co.)

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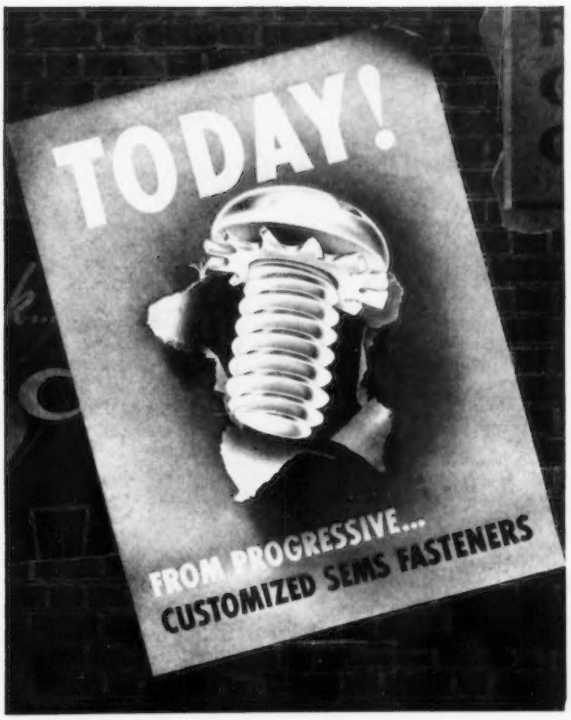

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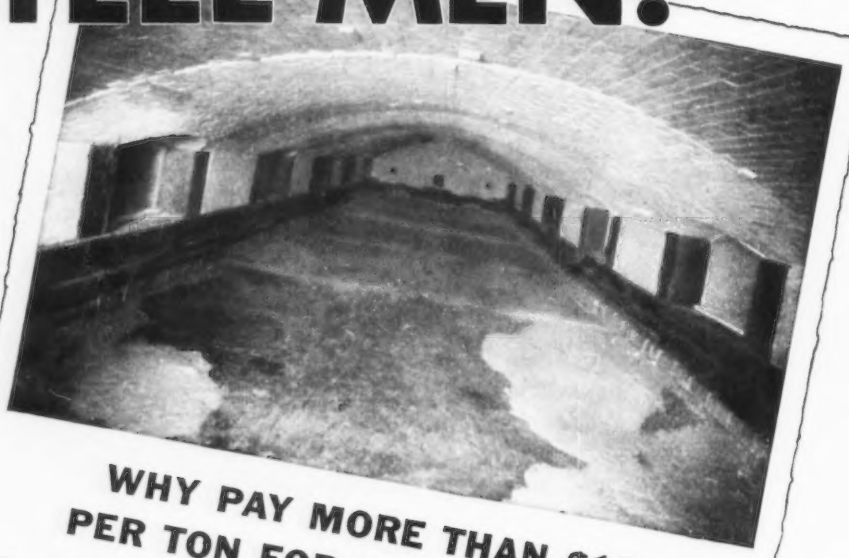

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The Iron Age Summary

Slow Demand Hits '57 Production

Output will barely top 113 million ingot tons due to fourth quarter slump.

But total will still be the third best year in history. Pick-up expected in first quarter.

■ Steel output this year will barely top 113 million ingot tons. There's an outside chance that production will drop below 113 million tons.

This is a bitter disappointment for the mills. They had expected a fourth quarter upturn to carry output to a level with last year's 115.2 million tons. Instead, orders dropped sharply and the mills were forced to cut back operations.

Not So Bad — Still, the steel picture is not so black as the short-term outlook makes it seem. Even 113 million tons would be the third best year in steel's history. And the continuing reduction in steel users' inventories is laying the groundwork for a healthier market in 1958.

The mills now are resigned to a sluggish market at least through first quarter of next year. At that time there may be a pickup in demand from the auto companies. The mills figure Detroit will want to build up an inventory of new cars in advance of auto labor negotiations.

Layoffs And Cutbacks — Meanwhile, steel firms are taking a more realistic attitude toward the market. They are shutting down unneeded steel and ironmaking furnaces. They're catching up on maintenance and repair work. And they're laying off workers or cutting back on the work-week in line with market conditions. Overtime is virtually non-existent in the mills.

Steel prices are holding firm, but premium prices are a thing of the past, even on so-called strong products. For example, Phoenix Iron & Steel has cut its price on heavy plate by $14 a ton to bring it into line with that of other producers.

1958 Bright Spots — One of the hardest hit steel areas is Youngstown, Ohio. There Republic Steel has shut down the last two of five openhearth furnaces for the balance of the year. Two Bessemer converter furnaces will be operated on an intermittent basis. Some 2700 steel workers have been laid off. The company blames a falloff in orders for buttweld pipe and tubing. In the same area, Youngstown Sheet & Tube Co. has taken off two openhearths at its Campbell works. Similar furnace shutdowns are reported for other steel firms.

On the outlook for 1958, IRON AGE points to the following encouraging factors: (1) steel user inventories will be down, (2) automotive sales are likely to pick up, (3) appliance sales are headed into an upturn, (4) construction prospects are good, (5) stepped-up defense buying will make itself felt during the year, (6) shipbuilding will remain strong, and (7) oil well drillings will be on a par with this year's 58,000 wells.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons 000 omitted)	1,779	1,831	1,997	2,511
Ingot Index				
(1947-1949=100)	110.7	114.0	124.3	156.3
Operating Rates				
Chicago	71.0	71.5*	78.0	101.0
Pittsburgh	66.5	75.0	80.0	102.0
Philadelphia	84.0	87.5	85.0	103.5
Valley	56.0	66.0	66.0	100.0
West	80.0	80.0*	80.0	103.0
Buffalo	63.5	63.5	80.5	105.0
Cleveland	69.0	68.5*	81.0	104.0
Detroit	87.0	87.0	90.0	104.0
S. Ohio River	75.0	76.0*	85.0	96.0
South	67.0	61.5	60.5	94.0
Upper Ohio R.	63.0	62.5	71.0	104.0
St. Louis	60.5	76.0	90.0	98.0
Northeast	40.0	40.0	40.0	100.0
Aggregate	69.5	71.5	78.0	102.0

*Revised

Prices At a Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.967	5.967	5.967	5.622
Pig Iron (Gross ton)	$66.42	$66.42	$66.42	$63.04
Scrap, No. 1 hvy (Gross ton)	$32.00	$32.00	$33.00	$65.17
No. 2 bundles	$24.00	$24.00	$24.67	$52.17
Nonferrous				
Aluminum ingot	28.10	28.10	28.10	27.10
Copper, electrolytic	27.00	27.00	27.00	40.00
Lead, St. Louis	12.80	12.80	13.30	15.80
Magnesium ingot	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	64.50
Tin Straits, N. Y.	92.50	90.25	89.50	106.00
Zinc, E. St. Louis	10.00	10.00	10.00	13.50

Conveyor Sales Slowing Down

Outlook for conveyor buyers is half good. Deliveries are current, but price increases may be coming.

Makers report users favor both off-the-shelf "packaged" units and more complex, fully automatic systems.

▪ "Use of conveyors will increase as management pays more and more attention to materials handling costs as just about the last major area over which it has much control."

That's the way R. C. Sollenberger, executive vice president of the Conveyor Equipment Manufacturers Assn., sees the future for his industry.

Something for Everyone—Pointing out that conveyor firms have something to offer a business no matter what operating techniques it uses, he notes two different trends in the industry as proof.

One is the swing to more off-the-shelf standardized conveyors available either as complete units or as sub-assemblies for the do-it-yourself plant engineer.

The other trend, equally as popular, has resulted in sales of more complex, fully automatic systems where the possibility of human error is cut to the minimum.

All conveyor manufacturers are conscious of the impact of automation on conveyor design. Among those surveyed by The IRON AGE other trends are also noted. They include:

Live Storage Gains—More use of live storage in materials handling. (Storage of semi-finished or finished parts right on the conveyor.)

Improvement in conveyor driving and control systems.

Greater adaptation of conveyor systems to such new plant layout techniques as perimeter feed.

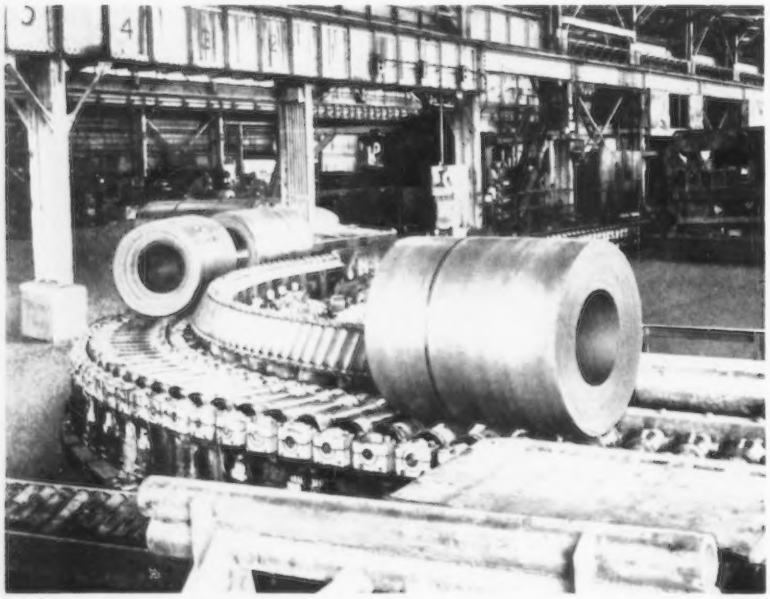
Users shopping for conveyors will find the market outlook mixed. Deliveries are current, but price increases appear to be on the way. Buyers can get most conveyors, except for custom made jobs, just about when they need them. Estimates for the industry, where there are about 80 types of products with hundreds of variations, are difficult. Shipments range all the way from stock to 18 months or more depending on the equipment furnished.

Sales Are Off — Most conveyor manufacturers look for price increases in the near future. Their own advanced labor and material costs have generally been absorbed until now but that trend probably won't continue.

The sales outlook for equipment suppliers isn't too bright. Sales for 1957 have been running anywhere from 15 to 25 pct below figures for '56. The slackening of orders in the capital goods field is expected to continue for the next six months. Therefore, it's expected by the Conveyor Equipment Manufacturers Assn., that sales in '58 will be from 10 to 15 pct below 1957 levels.

The Long View—All in all, conveyor manufacturers are not encouraged about the market outlook for the next six months.

However there's little long-range pessimism about the industry from the manufacturers. They believe they'll continue to develop products which will prove more and more valuable in battling materials handling problems.



ROLLING ALONG: Taking the bend on this hot strip mill conveyor requires some engineering. There are two mill bearings supporting each of the 42 rolls used in the curve section. (Link-Belt Co. photo.)

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S-2

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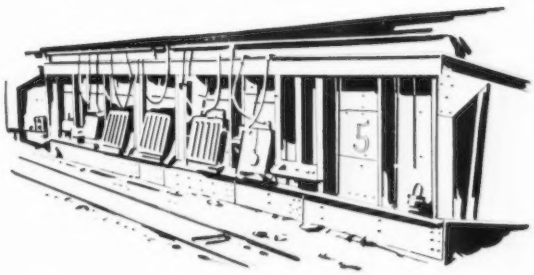

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STEEL PRODUCT MARKETS

Don't Expect Early Sheet Pickup

Producers are not optimistic about strong sheet activity in the first quarter.

Automotive steel buyers are already deferring tonnages into January or February.

■ Sheet producers have just about written off any hope of a strong first quarter pickup.

Reason: Their automotive buyers are busy pushing back December orders into January or February. The move has not only dampened current enthusiasm but cast a shadow over prospects for early '58.

The auto builders—who deferred the tonnages after revising their own production schedules — probably won't duplicate the postponed orders. It will just mean that much less tonnage in January or February. And the mills look for more deferments from Detroit next month.

Still Best Bet—Even where auto assembly lines are operating at top speed the buyers are stressing "on-time" deliveries from the mills and operating on low inventories. One steel producer was still waiting the go-ahead on auto tonnages for this month with one week of it already gone.

Despite this automotive is still the mainstay of the sheet market. The appliance makers, supposedly bottomed-out on inventories, continue looking the other way when steel salesmen call. And other sheet buyers don't need to cancel tonnages because they pare down requirements even before ordering.

Warehouses — Any widespread break in warehouse prices following the recent drop at Los Angeles doesn't appear likely. However, in a fiercely competitive market considerable price pressure still exists. The smaller outlets, in particular, indicate they are finding customers want warehouse steel and service at secondary mill prices. There's quite a bit of price cutting on secondary sheet and, in a few cases, extras are forgotten. Supplies of secondary sheet and product dumped on the market by consumers are influencing many areas. Some distributors are holding stocks low to reduce their year-end inventory taxes. They feel that the market doesn't warrent maintaining large supplies of steel.

Bar—Hot-rolled is a little improved, but cold finished bar is sagging lower with automotive cuts in ordering hurting what's left of the market. "It's 1954 all over again," says one **Pittsburgh** cold finisher. **Detroit** bar makers believe that alloy and cold drawn bars are suffering because many automotive applications can now use hot-rolled carbon bars. Mills in the **Cleveland** area are operating at under 60 pct of capacity with auto cutbacks a contributing factor. On the **West Coast,** automotive demand for flat bar stock has fallen off some 30 to 35 pct below last year's levels.

Plate—Improved supply of heavy plate reflects the break-up of this previously tight market. Fabricators are cutting back on their stocks of sheared mill product. Producers are eliminating quota systems and getting current on orders. The last premium price producer in the **East** —Phoenix Iron & Steel Co.—cut its price $14, dropping down to the level of other mills in the area. Brokers in that section are dumping plate on the market.

Structurals—Mills are rapidly becoming current on orders. Fabricators, as in plate, are cutting inventories. Even heavy structurals can be obtained in less than four weeks in the **Midwest.**

Wire Products—Sales of manufacturers' wire are at fairly good levels, but merchant wire and construction products are down more than seasonally. Mills making manufacturers' wire hope to hold December order volume—which is still well below year-ago levels—into January.

Seamless Pipe—Sales of oil country seamless are down in December with no pickup expected before next March. Oil producers are content to work off large inventories. It's clear that the mills are entering a period where deliveries will be competitive.

Pig Iron—Because of "curtailed activity in the iron foundry business" an 800 ton per day merchant furnace at the Central Furnaces and Dock plant of American Steel & Wire in Cleveland has been shut down. Also going out of service are a battery of coke ovens at the firm's Cleveland Coke Chemical Works.

Coke Price Changes—Price of foundry coke has been advanced at Buffalo to $31.80 and at Cleveland to $32.70. Increase is due to approval in Ohio of a 5 pct advance in freight rates.

PURCHASING AGENT'S CHECKLIST

Aluminum makers are out to get shipyard business. **P. 88**

Sales of gas generators have quadrupled in last five years with more gains expected. **P. 91**

How to plan to cut costs. An IRON AGE Survey Report. **P. 97**

COMPARISON OF PRICES

(Effective Dec. 10, 1957)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in **Heavy Type**; declines appear in *Italics*.

	Dec. 10 1957	Dec. 3 1957	Nov. 12 1957	Dec. 11 1956
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.925¢	4.925¢	4.925¢	4.675¢
Cold-rolled sheets	6.05	6.05	6.05	5.75
Galvanized sheets (10 ga.)	6.60	6.60	6.60	6.30
Hot-rolled strip	4.925	4.925	4.925	4.675
Cold-rolled strip	7.17	7.17	7.17	6.870
Plate	5.12	5.12	5.12	4.87
Plates, wrought iron	13.15	13.15	13.15	10.40
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	47.50
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$10.30	$10.30	$10.30	$9.95
Tin plates, electro (0.50 lb.)	9.00	9.00	9.00	8.65
Special coated mfg. ternes	9.55	9.55	9.55	9.20
Bars and Shapes: (per pound)				
Merchant bar	5.425¢	5.425¢	5.425¢	5.075¢
Cold finished bars	7.30	7.30	7.30	6.85
Alloy bars	6.475	6.475	6.475	6.125
Structural shapes	5.275	5.275	5.275	5.00
Stainless bars (No. 302)	45.00	45.00	45.00	40.75
Wrought iron bars	14.45	14.45	14.45	11.50
Wire: (per pound)				
Bright wire	7.65¢	7.65¢	7.65¢	7.20¢
Rails: (per 100 lb.)				
Heavy rails	$5.525	$5.525	$5.525	$5.075
Light rails	6.50	6.50	6.50	6.00
Semifinished Steel: (per net ton)				
Rerolling billets	$77.50	$77.50	$77.50	$74.00
Slabs, rerolling	77.50	77.50	77.50	74.00
Forging billets	96.00	96.00	96.00	91.50
Alloy blooms, billets, slabs	114.00	114.00	114.00	107.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.15¢	6.15¢	6.15¢	5.80¢
Skelp	4.875	4.875	4.875	4.225
Finished Steel Composite: (per pound)				
Base price	5.967¢	5.967¢	5.967¢	5.622¢

	Dec. 10 1957	Dec. 3 1957	Nov. 12 1957	Dec. 11 1956
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.51	$70.51	$70.51	$67.76
Foundry, Valley	66.50	66.50	66.50	63.00
Foundry, Southern Cin'ti	71.65	71.65	71.65	67.17
Foundry, Birmingham	62.50	62.50	62.50	59.00
Foundry, Chicago	66.50	66.50	66.50	63.00
Basic, del'd Philadelphia	70.01	70.01	70.01	66.84
Basic, Valley furnace	66.00	66.00	66.00	62.50
Malleable, Chicago	66.50	66.50	66.50	63.00
Malleable, Valley	66.50	66.50	66.50	63.00
Ferromanganese, 74-76 pct Mn, cents per lb†	12.25	12.25	12.25	11.75
Pig Iron Composite: (per gross ton)				
Pig iron	$66.42	$66.42	$66.42	$63.04
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$32.50	$32.50	$32.50	$66.50
No. 1 steel, Phila. area	33.00	33.00	34.00	62.50
No. 1 steel, Chicago	30.50	30.50	32.50	66.50
No. 1 bundles, Detroit	21.50	21.50	24.50	60.50
Low phos., Youngstown	33.50	32.50	33.50	70.50
No. 1 mach'y cast, Pittsburgh	50.50	50.50	50.50	61.50
No. 1 mach'y cast, Philadel'a	50.50	50.50	50.50	59.50
No. 1 mach'y cast, Chicago	40.50	40.50	40.50	58.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$32.00	$32.00	$33.00	$65.17
No. 2 bundles	24.00	24.00	24.67	52.17
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$15.38	$15.38	$15.38	$15.50
Foundry coke, prompt	$17.50-$19	$17.50-$19	$17.50-$19	$18-19
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	27.00	27.00	27.00	40.00
Copper, Lake, Conn.	27.00	27.00	27.00	40.00
Tin, Straits, N. Y.	**92.50‡**	90.25	89.50	106.00
Zinc, East St. Louis	10.00	10.00	10.00	13.50
Lead, St. Louis	12.80	12.80	13.50	15.80
Aluminum, virgin ingot	28.10	28.10	28.10	27.10
Nickel, electrolytic	74.00	74.00	74.00	64.50
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	33.00	33.00	33.00	33.00

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Averages of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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THE IMPROVED PENNSYLVANIA "TAX CLIMATE"

An Important Message for

MANUFACTURERS • DISTRIBUTORS • INDUSTRIAL REALTORS
MANAGEMENT AND ENGINEERING CONSULTANTS

Pennsylvania, this year, has taken major steps to create a "tax climate" favorable to new industry and expansion of established industries.

The 1957 Session of the General Assembly (the Commonwealth's legislature) which adjourned in June made the following basic tax changes:

1. Exempted manufacturers from the capital stock and franchise taxes;
2. Completed, state-wide, the elimination of machinery and equipment from local, ad valorem property taxation (there is no state-level general property tax in Pennsylvania);
3. Repealed the tax on stock transfers;
4. Made the temporary 3 per cent rate of the Pennsylvania Sales Tax permanent—now the principal source of Commonwealth revenues;
5. Reduced the sales tax on purchases made by manufacturing firms.

These changes, plus the absence of a state personal income tax, and the growing dependence of localities on non-property taxes, mean major "advantages", taxwise, to companies locating or expanding in Pennsylvania.

Get the whole story of Pennsylvania's new tax advantages. Send for booklet entitled "The Improved Pennsylvania Tax Climate"

Write to:

Pennsylvania Dept. of Commerce
Main Capitol Building
1011 State Street,
Harrisburg, Pennsylvania
Telephone CEdar 4-2912.

IRON AND STEEL SCRAP MARKETS

Has the Market Hit Bottom?

It's still too early to tell, but openhearth scrap prices in major consuming areas have stopped skidding.

In one major district, prices have even gone up. Is it a reverse in trend or just a breathing spell?

■ For the first time in nearly six months The IRON AGE steel scrap composite held steady for two weeks running. It offers hope to the scrap trade that perhaps the long-awaited "bottom" of the market has finally been reached.

If prices have touched bottom, it's not because of market activity. Scrap intake has just about dried up. Mills generally are not interested in buying and dealers are turning their backs on quoted prices.

And there is little prospect that mills will enter the market in the near future. They are still getting most of what they need from industrial sources. With operating rates falling off, they are needing less scrap each week.

A few optimists in scrap expect a pickup in mill activity after Jan. 1. But others foresee an extended period of doldrums for the trade. Some talk about closing down their yards until business picks up again.

On the bright side is a $1 price increase in steelmaking grades in the Cleveland-Youngstown districts, and this week's leveling off in the composite price of No. 1 heavy melting at $32.00. The composite price for No. 2 bundles held steady at $24.00.

Not since the last week in June and the first week in July, 1957, has the composite price remained unchanged.

Pittsburgh—The market is quiet but prices of dealer openhearth grades are holding firm. Dealers are resisting further price cuts. An offer of $29 for No. 2 bundles has brought only a small quantity of local scrap to one mill. The lag in steel operations and in mill buying is causing extreme pessimism in some scrap circles.

Chicago — In a relatively dull market, prices held along the entire list. Attempts to buy turnings at lower prices met with little success. Chief barrier to further declines appears to be lack of dealer scrap in the area and the existence of older orders at higher prices. Dealer stocks are extremely low. Scrap movement into the yards has been equally low. Cast appeared much stronger, due chiefly to the tight supply situation rather than new orders.

Philadelphia — Domestic shipments and collections are practically at a standstill. Bad weather is partly to blame, but the fundamental weakness is still lack of demand. Only export continues active. And even export is down noticeably from the peaks reached earlier in the year.

New York—Prices held at quoted levels for the third straight week, due to export activity. Trade sources repeat their claims that prices have reached the bottom.

Detroit — The trade sees little likelihood of any pickup for several months. Some dealers have become pessimistic enough to say they are thinking seriously of closing down their yards until conditions change. The only noteworthy activity in the past week was a sale of specially-prepared scrap for a local mill. It went for $1 lower than last month.

Cleveland—Prime foundry grades are picking up because foundries are switching away from pig iron. Steelmaking scrap is technically readjusting upward despite a dim outlook. Some No. 2 grades are going to Pittsburgh, but big movement is still in industrial lists.

St. Louis—A railroad list which included 2000 tons of No. 1 RR heavy melting was withdrawn because offers were too low. The leading consumer has not changed prices and says it will not until orders now outstanding are completed. Scrap movement continues light.

Birmingham—Brokers cut quotations for openhearth scrap on indications by one consumer that it might buy limited tonnage at the lower price. Dealers report no scrap intake. They show unwillingness to part with inventories at going price levels. Export is at a virtual standstill.

Cincinnati — A second area mill came into the market for moderate tonnage of No. 1 and No. 2 heavy melting at prevailing prices. However, dealers are still reluctant to sell, shipping only enough to meet expenses. The cast market is up $1.

Buffalo—An expected small mill purchase failed to materialize. It was the only sign of activity. Prices remained unchanged but the dull market may bring further declines soon.

Boston — A flurry of activity brought a $2 increase in No. 2 bundles and a $1 increase in chemical borings prices. Declines were noted in machine shop turnings and mixed cupola cast. Large orders are non-existent.

West Coast—Prices are weak and the scrap outlook is dull. The little exporting that is going on is the only prop to the market. Mills are accepting small tonnage commitments without enthusiasm.

Get One of These Specialists to Handle Your Scrap Metal More Economically

For light or heavy lifts . . . for work at one location or at widely scattered sites, Bucyrus-Erie Transit Cranes, crawler cranes, and Hydrocranes offer many cost-cutting features. Your most exacting requirements can be met by a standard crawler-mounted 22-B, a heavy-duty 22-B, a carrier-mounted Transit Crane, or a truck-mounted Hydrocrane. Look over the brief descriptions given here, then ask us for detailed specifications on the crane of your choice.

TRANSIT CRANE: Carrier-mounted and easy to operate, fast-working Bucyrus-Erie Transit Cranes of 15-, 25-, and 35-ton capacities provide speed needed for round-the-yard moves and for on-the-street travel to outlying pick-up points.

The standard 15-B and 22-B Transit Crane booms are 30 feet, extendible by removable inserts to 70 feet on the 15-B, 80 feet on the 22-B; the 40-ft. boom of the 30-B can be increased to 130 feet by adding inserts. Special equipment is available at extra cost for folding 60- to 90-ft. booms for job-to-job moves.

Fast, accurate boom control is achieved by independent power-controlled lowering boom hoist. Power-controlled load lowering on the main hoist line permits delicate positioning of loads.

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For extra heavy lifting there's the crawler-mounted heavy-duty 22-B. In addition to the above features, the heavy-duty 22-B has special extra-rugged parts for continued tough work. Power-controlled lowering on main hoist line permits delicate positioning of loads. Friction swing brake permits more accurate spotting and holding of boom point over desired position.

HYDROCRANE: Telescoping boom provides long reach on loading jobs, compactness for traveling. The all-hydraulic truck-mounted crane — with 5-ton or 10-ton capacity — moves through traffic easily or speeds at 50-mph over the highway to load scrap quickly at distant pick-up points. These borderline jobs yield big profit returns for you through lower per-ton pick-up costs. Time saved is money earned. 372E57

BUCYRUS ERIE

A Familiar Sign at Scenes of Progress

BUCYRUS-ERIE COMPANY
South Milwaukee, Wisconsin

SCRAP PRICES *Effective Dec. 10, 1957*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$32.00 to $33.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 dealer bundles	32.00 to 33.00
No. 1 factory bundles	35.00 to 36.00
No. 2 bundles	28.00 to 29.00
No. 1 busheling	32.00 to 33.00
Machine shop turn.	16.00 to 17.00
Mixed bor. and ms. turn.	16.00 to 17.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	20.00 to 21.00
Low phos. punch'gs plate	35.00 to 36.00
Heavy turnings	31.00 to 32.00
No. 1 RR hvy. melting	35.00 to 36.00
Scrap rails, random lgth.	47.00 to 48.00
Rails 2 ft and under	56.00 to 57.00
RR steel wheels	46.00 to 47.00
RR spring steel	46.00 to 47.00
RR couplers and knuckles	46.00 to 47.00
No. 1 machinery cast	50.00 to 51.00
Cupola cast	39.00 to 40.00
Heavy breakable cast	37.00 to 38.00

Chicago

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 dealer bundles	30.00 to 31.00
No. 1 factory bundles	35.00 to 36.00
No. 2 bundles	19.00 to 20.00
No. 1 busheling	30.00 to 31.00
Machine shop turn.	16.00 to 17.00
Mixed bor. and turn.	18.00 to 19.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	18.00 to 19.00
Low phos. forge crops	43.00 to 44.00
Low phos. punch'gs plate	39.00 to 40.00
Low phos. 3 ft and under	38.00 to 39.00
No. 1 RR hvy. melting	35.00 to 36.00
Scrap rails, random lgth.	41.00 to 42.00
Rerolling rails	48.00 to 49.00
Rails 2 ft and under	47.00 to 48.00
Locomotive tires cut	43.00 to 44.00
Cut bolsters & side frames	40.00 to 41.00
Angles and splice bars	45.00 to 46.00
RR steel car axles	48.00 to 49.00
RR couplers and knuckles	42.00 to 43.00
No. 1 machinery cast	40.00 to 41.00
Cupola cast	35.00 to 36.00
Heavy breakable cast	33.00 to 34.00
Cast iron brake shoe	35.00 to 36.00
Cast iron wheels	39.00 to 40.00
Malleable	46.00 to 47.00
Stove plate	33.00 to 34.00
Steel car wheels	44.00 to 45.00

Philadelphia Area

No. 1 hvy. melting	$32.50 to $33.50
No. 2 hvy. melting	29.50 to 30.50
No. 1 dealer bundles	32.50 to 33.50
No. 2 bundles	23.50 to 24.50
No. 1 busheling	32.50 to 33.50
Machine shop turn.	21.00 to 22.00
Mixed bor. short turn.	22.00 to 23.00
Cast iron borings	22.00 to 23.00
Shoveling turnings	23.00 to 24.00
Clean cast. chem. borings	30.00 to 31.00
Low phos. 3 ft and under	39.00 to 40.00
Low phos. 2 ft and under	40.00 to 41.00
Low phos. punch'gs	40.00 to 41.00
Elec. furnace bundles	36.00 to 37.00
Heavy turnings	28.50 to 29.50
RR steel wheels	45.00 to 46.00
RR spring steel	45.00 to 46.00
Rails 18 in. and under	63.00 to 64.00
Cupola cast	36.00 to 38.00
Heavy breakable cast	36.00 to 37.00
Cast iron car wheels	41.00 to 42.00
Malleable	55.00 to 56.00
Unstripped motor blocks	32.00 to 33.00
No. 1 machinery cast	50.00 to 51.00

Cleveland

No. 1 hvy. melting	$27.00 to $28.00
No. 2 hvy. melting	21.00 to 22.00
No. 1 dealer bundles	27.00 to 28.00
No. 1 factory bundles	31.00 to 32.00
No. 2 bundles	20.00 to 21.00
No. 1 busheling	27.00 to 28.00
Machine shop turn.	10.00 to 11.00
Mixed bor. and turn.	14.00 to 15.00
Shoveling turnings	14.00 to 15.00
Cast iron borings	14.00 to 15.00
Cut struct'r'l & plates, 2 ft & under	35.00 to 36.00
Drop forge flashings	27.00 to 28.00
Low phos. punch'gs, plate	28.00 to 29.00
Foundry steel, 2 ft & under	33.00 to 34.00
No. 1 RR heavy melting	32.00 to 33.00
Rails 2 ft and under	53.00 to 54.00
Rails 18 in. and under	54.00 to 55.00
Railroad grate bars	14.00 to 15.00
Steel axle turnings	15.00 to 16.00
Railroad cast	42.00 to 43.00
No. 1 machinery cast	44.00 to 45.00
Stove plate	40.00 to 41.00
Malleable	54.00 to 55.00

Youngstown

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	30.00 to 31.00
No. 2 bundles	23.00 to 24.00
Machine shop turn.	13.00 to 14.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Low phos. plate	33.00 to 34.00

Buffalo

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	26.50 to 27.50
No. 1 busheling	29.00 to 30.00
No. 1 dealer bundles	29.00 to 30.00
No. 2 bundles	23.50 to 24.50
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	14.00 to 15.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	15.00 to 16.00
Low phos. plate	35.00 to 36.00
Scrap rails, random lgth.	41.00 to 42.00
Rails 2 ft and under	51.00 to 52.00
RR steel wheels	38.00 to 39.00
RR spring steel	34.00 to 35.00
RR couplers and knucklers	34.00 to 35.00
No. 1 machinery cast	41.00 to 42.00
No. 1 cupola cast	36.00 to 37.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$21.00 to $22.00
No. 2 hvy. melting	18.00 to 19.00
No. 1 dealer bundles	21.00 to 22.00
No. 2 bundles	16.00 to 17.00
No. 1 busheling	20.00 to 21.00
Drop forge flashings	20.00 to 21.00
Machine shop turn.	8.00 to 9.00
Mixed bor. and turn.	10.00 to 11.00
Shoveling turnings	10.00 to 11.00
Cast iron borings	10.00 to 11.00
Low phos. punch'gs plate	21.00 to 22.00
No. 1 cupola cast	29.00 to 30.00
Heavy breakable cast	24.00 to 25.00
Stove plate	24.00 to 25.00
Automotive cast	32.00 to 33.00

St. Louis

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 dealer bundles	37.00 to 38.00
No. 2 bundles	26.00 to 27.00
Machine shop turn.	16.00 to 17.00
Cast iron borings	18.00 to 19.00
Shoveling turnings	18.00 to 19.00
No. 1 RR hvy. melting	38.50 to 39.50
Rails, random lengths	42.00 to 43.00
Rails, 18 in. and under	48.00 to 49.00
Angles and splice bars	40.00 to 41.00
Std. steel car axles	44.00 to 45.00
RR specialties	43.00 to 44.00
Cupola cast	42.00 to 43.00
Heavy breakable cast	35.00 to 36.00
Cast iron brake shoes	37.00 to 38.00
Stove plate	36.00 to 37.00
Cast iron car wheels	33.00 to 34.00
Rerolling rails	46.00 to 47.00
Unstripped motor blocks	35.00 to 36.00

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$23.00 to $24.00
No. 2 hvy. melting	20.00 to 21.00
No. 1 dealer bundles	23.00 to 24.00
No. 2 bundles	15.00 to 16.00
No. 1 busheling	23.00 to 24.00
Elec. furnace, 3 ft & under	29.00 to 30.00
Machine shop turn.	8.50 to 9.50
Mixed bor. and short turn.	9.50 to 10.50
Shoveling turnings	10.00 to 11.00
Clean cast chem. borings	16.00 to 17.00
No. 1 machinery cast	34.00 to 35.00
Mixed cupola cast	27.00 to 28.00
Heavy breakable cast	25.00 to 26.00
Stove plate	26.00 to 27.00
Unstripped motor blocks	27.00 to 28.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	26.00 to 27.00
No. 2 dealer bundles	19.00 to 20.00
Machine shop turn.	11.00 to 12.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	15.00 to 16.00
Clean cast. chem. borings	23.00 to 24.00
No. 1 machinery cast	34.00 to 35.00
Mixed yard cast	29.00 to 30.00
Charging box. cast	30.00 to 31.00
Heavy breakable cast	30.00 to 31.00
Unstripped motor blocks	27.00 to 28.00

Birmingham

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	29.00 to 30.00
No. 2 bundles	16.00 to 17.00
No. 1 busheling	29.00 to 30.00
Machine shop turn.	20.00 to 21.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	11.00 to 12.00
Electric furnace bundles	35.00 to 36.00
Elec. furnace, 3 ft & under	33.00 to 34.00
Bar crops and plate	38.00 to 39.00
Structural and plate, 2 ft	38.00 to 39.00
No. 1 RR hvy. melting	34.00 to 35.00
Scrap rails, random lgth.	40.00 to 41.00
Rails, 18 in. and under	46.00 to 47.00
Angles & splice bars	40.00 to 41.00
Rerolling rails	47.00 to 48.00
No. 1 cupola cast	47.00 to 48.00
Stove plate	47.00 to 48.00
Charging box cast	22.00 to 23.00
Cast iron car wheels	36.00 to 37.00
Unstripped motor blocks	37.00 to 38.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	29.00 to 30.00
No. 2 bundles	20.00 to 21.00
Machine shop turn.	14.00 to 15.00
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Low phos., 18 in. and under	37.00 to 38.00
Rails, random length	42.00 to 43.00
Rails, 18 in. and under	52.00 to 53.00
No. 1 cupola cast	36.00 to 37.00
Hvy. breakable cast	32.00 to 33.00
Drop broken cast	47.00 to 48.00

San Francisco

No. 1 hvy. melting	$36.00
No. 2 hvy. melting	34.00
No. 1 dealer bundles	34.00
No. 2 bundles	26.00
Machine shop turn.	20.00
Cast iron borings	20.00
No. 1 RR hvy. melting	36.00
No. 1 cupola cast	45.00

Los Angeles

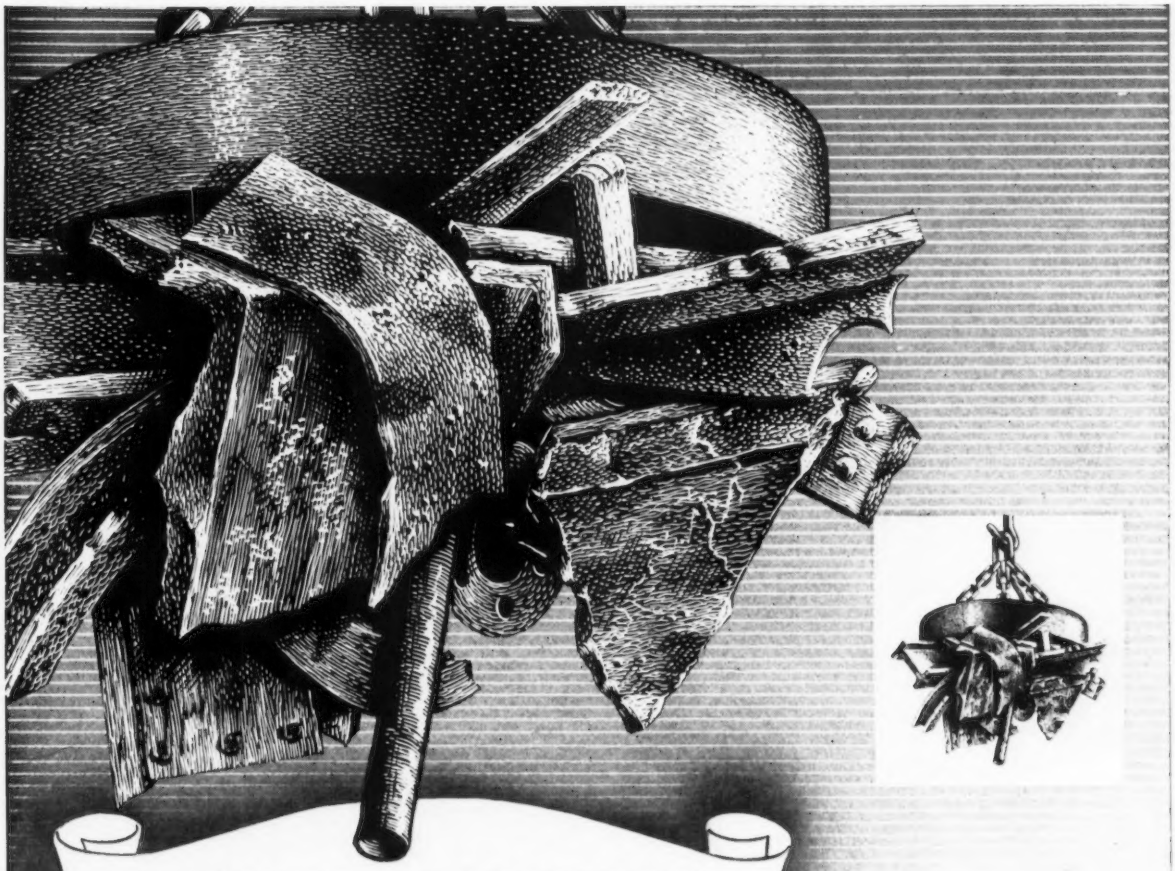
No. 1 hvy. melting	$36.00
No. 2 hvy. melting	34.00
No. 1 dealer bundles	32.00
No. 2 bundles	24.00
Machine shop turn.	15.00
Shoveling turnings	18.00
Cast iron borings	18.00
Elec. furn. 1 ft and under (foundry)	47.00
No. 1 RR hvy. melting	39.00
No. 1 cupola cast	42.00

Seattle

No. 1 hvy. melting	$34.00
No. 2 hvy. melting	32.00
No. 2 bundles	26.00
No. 1 cupola cast	38.00
Mixed yard cast	38.00

Hamilton, Ont.

No. 1 hvy. melting	$34.00
No. 2 hvy. melting	29.00
No. 1 dealer bundles	34.00
No. 2 bundles	24.00
Mixed steel scrap	29.00
Busheling	24.00
Bush., new fact, prep'd	34.00
Bush., new fact, unprep'd	28.00
Machine shop turn.	19.00
Short steel turn.	23.00
Mixed bor. and turn.	19.00
Rails, rerolling	43.00
Cast scrap	$44.00 to 49.00



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Philadelphia 7, Penna.

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Steep Tin Cutbacks Surprise Trade

International Tin Council cuts exports by 28½ pct. U. S. traders say 10-15 pct would be enough.

ITC also drops ceiling for sale of buffer stock tin. Some importers say they can't operate in the narrower range.

▪ The International Tin Council has stacked the deck against U. S. consumers and importers. This is the view of many of the largest tin traders in New York.

As expected, ITC slashed exports from producing countries, effective from Dec. 15, 1957 to March 14, 1958. There will be 28½ pct less tin available. The trade felt an equitable cut would have been 10-15 pct.

One New York trader calls the unexpected drop a "move of desperation." He points out recent reports that the buffer stock of the ITC contained 10,000 tons of tin on Nov. 21, probably has another 2000 to 3000 tons by now. This, he says is a lot more than most people had figured. It means ITC is running low on money to buy more tin. He believes they have gone too far in a panic to keep all surplus tin off the market.

Could Cause Shortage—Another trader concurs, says if the Council sticks to its guns on this it could cause a short supply of tin, no matter how much the Russians dump on free world markets.

A more conservative observer calls the major cut "rather confusing." Evidently many tin buyers agree. The impending higher prices due to the expected reduction in available tin has not caused much hedge or speculative buying. The market is quiet and dull.

Export Picture — Exports that will be permitted during the control period, from the major producing countries, and the cuts:

Country	Exports (long tons)	Reduction
Malaya	10,125	32 pct
Indonesia	5516	21 pct
Bolivia	5516	19 pct
Thailand	1985	39 pct
Nigeria	1442	40 pct
Belgian Congo	2416	29 pct

The International Tin Council made several other bids to hypo its cash reserves. In notifying producing countries another contribution to the buffer stock was in order, George Peter, finance chairman requested all cash.

Expect Cash — Many traders think the producers will make an effort to comply, despite the fact that at current prices it would be cheaper to send metal.

The Council also gave the buffer stock manager permission to sell his tin when the London price hits 781 pounds sterling, per ton (97.625¢ per lb).

It is generally conceded the price of tin will fluctuate within a range bounded roughly, by the points at which the buffer stock manager may buy and sell. Some traders and importers say the new regulation narrows the range so they just don't have room to operate.

Buy and Sell Points—Here's the picture on how the buffer manager may act:

May Buy

London price—730 pounds sterling per ton (91.25¢ per lb)

May Sell

London price—781 pounds sterling per ton (97.625¢ per lb)

Aluminum

Aluminum Co. of America has revised its line of standard construction pipe for uses other than irrigation. Wall thicknesses in all but one O.D. have been changed. The exception indicates the new prices are lower per lb of aluminum.

Price of pipe with 5 in. O.D., wall thickness 0.052 in., now ranges from $51.50 per 100 ft for 90,000 lb or more, to $79.25 for less than 500 lb. The former price range was $57.05 to $82.65.

Copper

Major African producers, and a representative of the Chilean Copper Dept. are conferring in London on how to balance world supply and demand. Most significant report to date is the unofficial observation that the Chileans seem amenable to the possibility of production cutbacks.

Tin prices for the week: Dec. 4—91.50; Dec. 5—92.00; Dec. 6—92.875; Dec. 9—92.625; Dec. 10—92.50.*

*Estimate.

Primary Prices

(cents per lb)	Current price	last price	date of change
Aluminum pig	26.00	25.00	8/1/57
Aluminum ingot	28.10	27.10	8/1/57
Copper (E)	27.00	28.50	9/3/57
Copper (CS)	25.00	25.50	11/21/57
Copper (L)	27.00	28.50	9/3/57
Lead, St. L.	12.80	13.30	12/2/57
Lead, N. Y.	13.00	13.50	12/2/57
Magnesium ingot	36.00	34.09	8/13/56
Magnesium pig	35.25	33.75	8/13/56
Nickel	74.00	64.50	12/6/56
Titanium sponge	165.250	165.225	5/5/57
Zinc, E. St. L.	10.00	10.50	7/1/57
Zinc, N. Y.	10.50	11.00	7/1/57

ALUMINUM: 99% ingot frt allwd. **COPPER:** (E) = electrolytic, (CS) = custom smelters, electrolytic, (L) = lake. **LEAD:** common grade. **MAGNESIUM:** 99.8% pig. Velasco, Tex. **NICKEL:** Port Colbourne Canada. **ZINC:** prime western. **TIN:** see above; other primary prices, pg. 184.

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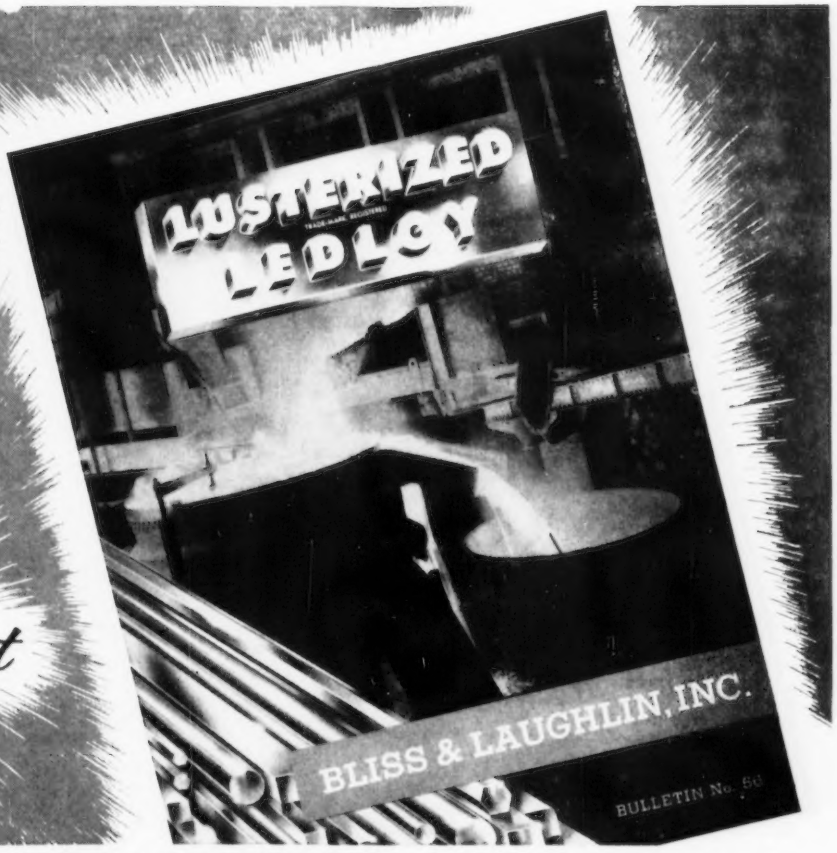
FACTS

you'll want to know about . . .



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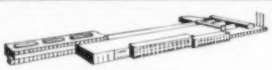
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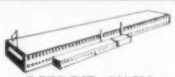
DETROIT, MICH.

BUFFALO, N. Y.

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NONFERROUS PRICES

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish) and Plate

("F" temper except 6061-0)

Alloy	.032	.081	136-249	250-3
1100, 3003	46 6	44 3	43 6	42 7
5052	54 0	48 9	47 2	45 4
6061-0	51 4	47 0	45 2	45 1

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6–8	45 0-46 8	60 4-64 1
12–14	45 7-47 2	61 3-65 8
24–26	49 0-49 5	72 1-76 8
36–38	58 0-58 6	96 2-99 8

Screw Machine Stock—2011-T-3

Size*	¼	⅝-⅞	¾-1	1¼-1½
Price	63 0	62 5	61 0	58 6

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1 420	$1 893	$2 367	$2 839
.024 gage	1 774	2 366	2 957	3 549

MAGNESIUM

(F.o.b. shipping Pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	250-3 00	250-2 00	188	081	032
AZ31B Stand. Grade		67 9	69 0	77 9	108 1
AZ31B Spec.		93 3	95 7	108 7	171 3
Tread Plate		70 6	71 7		
Tooling Plate	73 0				

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	69 6	70 7	75 6	89 2
Spec. Grade (AZ31B)	84 6	85 7	90 6	104 2

Alloy Ingot

AZ91B (Die Casting) ... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	126	106	128
Strip, CR	124	108	138
Rod, bar, HR	102	85	109
Angles, HR	102	85	109
Plates, HR	120	101	121
Seamless tube	147	120	200
Shot, blocks		87	

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Red	Tube
Copper	50 13		47 36	50 32
Brass, 70/30	44 02	44 56	45 26	46 93
Brass, Low	45 50	47 04	46 44	49 31
Brass, R L	47 37	47 91	47 31	50 18
Brass, Naval	48 27		42 58	51 68
Munts Metal	46 89		42 20	
Comm. Bs.	48 78	49 32	48 72	51 34
Mang. Bs.	52 01		46 11	
Phos. Bs. 5%	69 07		69 57	

Free Cutting Brass Rod ... 32.50

TITANIUM

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, $9.50-$10.60; alloy, $14.75; Plate, HR, commercially pure, $8.00-$8.75; alloy, $10.75. Wire, rolled and/or drawn, commercially pure, $7.50-$8.00; alloy $10.00; Bar, HR or forged, commercially pure, $6.15-$6.40; alloy, $6.15-$6.35; billets, HR, commercially pure, $6.00-$6.25; alloy, $6.90-$6.20.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex. ... 33.50
Beryllium aluminum 5% Be, Dollar per lb contained Be ... $74.75
Beryllium copper, per lb cont'd Be, $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading ... $71.50
Bismuth, ton lots ... $ 2.25
Cadmium, del'd ... 1.70
Calcium, 99.9%, small lots ... $ 4.55
Chromium, 99.8% metallic basis ... $ 1.31
Cobalt, 97-98% (per lb) ... $2.00 to $2.07
Germanium, per gm, f.o.b. Miami, Okla., refined ... 39.50 to 53.50
Gold, U. S. Treas, per troy oz. ... $35.00
Indium, 99.9%, dollars per troy oz. ... $ 2.25
Iridium, dollars per troy oz. ... $80 to $90
Lithium, 98% ... $11.00 to $14.00
Magnesium, sticks, 100 to 500 lb. ... 59.00
Mercury, dollars per 76-lb flask, f.o.b. New York ... $225 to $230
Nickel oxide sinter at Copper Cliff, Ont., contained nickel ... 71.25
Palladium, dollars per troy oz. ... $23 to $24
Platinum, dollars per troy oz. ... $77 to $80
Rhodium ... $120.00 to $125.00
Silver ingots (¢ per troy oz.) ... 90.00
Thorium, per kg ... $40.00
Vanadium ... $ 3.15
Zirconium sponge ... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
No. 115 ... 27.25
No. 120 ... 26.25
No. 123 ... 25.50
80-10-10 ingot
No. 305 ... 31.25
No. 315 ... 29.25
88-10-2 ingot
No. 210 ... 28.25
No. 215 ... 24.00
No. 245 ... 20.75
Yellow ingot
No. 405 ... 22.75
Manganese bronze
No. 421 ... 24.50

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
0.20 copper max ... 25.25-26.50
0.60 copper max ... 25.00-26.25
Piston alloys (No. 122 type) ... 24.25-25.00
No. 12 alum. (No. 2 grade) ... 22.00-23.00
108 alloy ... 22.25-23.50
195 alloy ... 25.25-26.75
13 alloy (0.60 copper max.) ... 25.00-26.25
AXS-679 ... 22.25-23.50

Steel deoxidizing aluminum, notch bar granulated or shot

Grade 1—95-97½% ... 23.00-24.00
Grade 2—92-95% ... 21.75-22.50
Grade 3—90-92% ... 20.50-21.50
Grade 4—85-90% ... 18.25-19.25

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	23	22¼
Yellow brass	17⅜	15⅜
Red brass	20¼	19½
Comm. bronze	21	20¼
Mang. bronze	16⅛	15⅜
Yellow brass rod ends	17⅛	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire ... 21
No. 2 copper wire ... 19½
Light copper ... 17¼
*Refinery brass ... 19¼
Copper bearing material ... 18¾
*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire ... 21
No. 2 copper wire ... 19½
Light copper ... 17¼
No. 1 composition ... 19¼
No. 1 comp. turnings ... 18¾
Hvy. yellow brass solids ... 13
Brass pipe ... 15½
Radiators ... 15¼

Aluminum

Mixed old cast ... 13½—14
Mixed new clips ... 16 —16½
Mixed turnings, dry ... 14 —15

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire ... 18½—19
No. 2 copper wire ... 16½—17
Light copper ... 15 —15½
Auto radiators (unsweated) ... 11¾—12
No. 1 composition ... 15½—16
No. 1 composition turnings ... 15 —15½
Cocks and faucets ... 12 —12½
Clean heavy yellow brass ... 11 —11½
Brass pipe ... 12½—13
New soft brass clippings ... 13 —13½
No. 1 brass rod turnings ... 11¾—12¼

Aluminum

Alum. pistons and struts ... 5½— 6
Aluminum crankcases ... 10½— 11
1100 (2S) aluminum clippings ... 14 —14½
Old sheet and utensils ... 10½—11
Borings and turnings ... 6½— 7
Industrial castings ... 10½—11
2024 (24S) clippings ... 12 —12½

Zinc

New zinc clippings ... 4 — 4½
Old zinc ... 3 — 3¼
Zinc routings ... 1¾— 2
Old die cast scrap ... 1½— 1¾

Nickel and Monel

Pure nickel clippings ... 45-50
Clean nickel turnings ... 40-45
Nickel anodes ... 45-50
Nickel rod ends ... 45-50
New Monel clippings ... 31-32
Clean Monel turnings ... 20-22
Old sheet Monel ... 28-30
Nickel silver clippings, mixed ... 18
Nickel silver turnnigs, mixed ... 15

Lead

Soft scrap lead ... 8½— 9
Battery plates (dry) ... 3½— 3¾
Batteries, acid free ... 2¾— 3

Miscellaneous

Block tin ... 75 —76
No. 1 pewter ... 59 —60
Auto babbitt ... 39 —40
Mixed common babbitt ... 11 —11½
Solder joints ... 14½—15
Siphon tops ... 42
Small foundry type ... 12 —12¼
Monotype ... 12 —12¼
Linotype and stereotype ... 11 —11¼
Electrotype ... 10 —10¼
Hand picked type shells ... 7 — 7½
Linotype and stereotype dross ... 3 — 3½
Electrotype dross ... 2½— 2¾

(Effective Dec. 9, 1957)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide Flange	Hot rolled	Cold rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot rolled	Alloy Cold rolled
EAST	Bethlehem, Pa.			$114.00 *B3*		5.325 *B3*	7.80 *B3*	5.325 *B3*						
	Buffalo, N. Y.	$77.50 *R3, B3*	$96.00 *R3, B3*	$111.00 *R3, B3*	6.225 *B3*	5.325 *B3*	7.80 *B3*	5.325 *B3*	4.925 *R3, B3*	7.15 *S10*	7.325 *B3*			
	Phila., Pa.									7.70 *P15*				
	Harrison, N. J.													15.05 *C11*
	Conshohocken, Pa.		$101.00 *A2*	$121.00 *A2*					4.975 *A2*	7.20 *A2*	7.325 *A2*			
	New Bedford, Mass.									7.60 *R6*				
	Johnstown, Pa.	$77.50 *B3*	$96.00 *B3*	$114.00 *B3*		5.325 *B3*	7.80 *B3*							
	Boston, Mass.									7.70 *T8*				15.40 *T8*
	New Haven, Conn.									7.60 *D1*				
	Baltimore, Md.									7.15 *T8*				
	Phoenixville, Pa.					5.325 *P2*		5.325 *P2*						
	Sparrows Pt., Md.								4.925 *B3*		7.325 *B3*			
	Bridgeport, Wallingford, Conn.			$114.00 *N8*						7.60 *W1*				
	Pawtucket, R. I. Worcester, Mass.									7.70 *N7* 7.70 *A5*				15.40 *N7* 15.20 *T8*
MIDDLE WEST	Alton, Ill.								5.125 *L1*					
	Ashland, Ky.								4.925 *A7*					
	Canton-Massillon, Dover, Ohio		$96.00 *R3*	$114.00 *R3, T3*						7.15 *G4*		10.45 *G4*		14.85 *C11*
	Chicago, Ill. Franklin Park, Ill. Evanston, Ill.	$77.50 *U1, R3*	$96.00 *U1, R3,W8*	$114.00 *U1, R3,W8*	6.225 *U1*	5.275 *U1, W8,P13*	7.75 *U1,Y1, W8*	5.275 *U1*	4.925 *W8, N4,A1*	7.25 *A1,T8, M8*			8.10 *W8, S9,I3*	15.05 *A1, S9,G4*
	Cleveland, Ohio									7.15 *A5,J3*		10.45 *A5*	8.10 *J3*	
	Detroit, Mich.			$114.00 *R3*					5.025 *G3, M2*	7.25 *M2,D1, D2,G3,P11*	7.425 *G3*	10.60 *D2* 10.55 *G3*	8.10 *G3*	
	Anderson, Ind.									7.15 *G4*				
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$77.50 *U1*	$96.00 *U1*	$111.00 *U1, Y1*		5.275 *U1, I3*	7.75 *U1, I3*	5.275 *I3*	4.925 *U1, I3,Y1*	7.15 *Y1*	7.325 *U1, I3,Y1*	10.60 *Y1*	8.10 *U1, Y1*	
	Sterling, Ill.	$77.50 *N4*				5.275 *N4*			5.025 *N4*					
	Indianapolis, Ind.									7.30 *J3*				15.20 *J3*
	Newport, Ky.												8.10 *A9*	
	Middletown, Ohio													
	Niles, Warren, Ohio Sharon, Pa.		$96.00 *S1, C10*	$111.00 *C10,S1*					4.925 *R3, S1*	7.15 *R3,T4 S1*	7.325 *R3, S1*	10.50 *S1* 10.45 *R3*	8.10 *S1*	15.05 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa. Aliquippa, Pa.	$77.50 *U1, P6*	$96.00 *U1, C11,P6*	$111.00 *U1, C11,B7*	6.225 *U1*	5.275 *U1, J3*	7.75 *U1, J3*	5.275 *U1*	4.925 *P6*	7.15 *J3,B4, S7*			8.10 *S9*	15.05 *S9*
	Weirton, Wheeling, Follansbee, W. Va.				6.225 *W3*	5.275 *W3*			4.925 *W3*	7.15 *W3,F3*	7.325 *W3*	10.50 *W3*		
	Youngstown, Ohio	$77.50 *R3*	$96.00 *Y1, C10*	$111.00 *Y1*			7.75 *Y1*			7.15 *Y1,J3*	7.325 *U1, Y1*	10.65 *Y1*	8.10 *U1, Y1*	15.05 *J3* 10.65 *Y1*
WEST	Fontana, Cal.	$88.00 *K1*	$105.50 *K1*	$135.00 *K1*		6.075 *K1*	8.55 *K1*	6.225 *K1*	5.825 *K1*	9.00 *K1*				
	Geneva, Utah		$96.00 *C7*			5.275 *C7*	7.75 *C7*							
	Kansas City, Mo.					5.375 *S2*	7.85 *S2*						8.35 *S2*	
	Los Angeles, Torrance, Cal.		$105.50 *B2*	$134.00 *B2*		5.975 *C7, B2*	8.45 *B2*		5.675 *C7, B2*	9.05 *J3*			9.30 *B2*	17.25 *J3*
	Minnequa, Colo.					5.575 *C6*			6.025 *C6*	9.10 *K1*				
	Portland, Ore.					6.025 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$105.50 *B2*			5.925 *B2*	8.40 *B2*		5.675 *C7, B2*					
	Seattle, Wash.		$109.50 *B2*			6.025 *B2*	8.50 *B2*		5.925 *B2*					
SOUTH	Atlanta, Ga.					5.475 *A8*			5.125 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$77.50 *T2*	$96.00 *T2*			5.275 *T2, R3,C16*	7.75 *T2*		4.925 *T2, R3,C16*		7.325 *T2*			
	Houston, Lone Star, Texas		$101.00 *S2*	$119.00 *S2*		5.375 *S2*	7.85 *S2*						8.35 *S2*	

(Effective Dec. 9, 1957)

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS								WIRE ROD	TINPLATE†		BLACK PLATE
		Hot rolled *18* ga. & hvyr.	Cold rolled	Galvanized	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* *1.25* lb. base box	Electro* *0.25* lb. base box	Holloware Enameling *29* ga.
EAST	Bethlehem, Pa.												
	Buffalo, N. Y.	4.925 *B3*	6.05 *B3*				7.275 *B3*	8.975 *B3*		6.15 *W6*			
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	4.975 *A2*	6.10 *A2*				7.325 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.15 *B3*			
	Fairless, Pa.	4.975 *U1*	6.10 *U1*				7.325 *U1*	9.025 *U1*			$10.15 *U1*	$8.85 *U1*	
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	4.925 *B3*	6.05 *B3*	6.60 *B3*			7.275 *B3*	8.975 *B3*	9.725 *B3*	6.25 *B3*	$10.15 *B3*	$8.85 *B3*	
	Worcester, Mass.									6.45 *A5*			
	Trenton, N. J.												
MIDDLE WEST	Alton, Ill.									6.35 *L1*			
	Ashland, Ky	4.925 *A7*		6.60 *A7*	6.625 *A7*								
	Canton-Massillon, Dover, Ohio			6.60 *R3, R1*									
	Chicago, Joliet, Ill.	4.925 *W8, A1*					7.275 *U1*			6.15 *A5, R3,W8, N4, K2*			
	Sterling, Ill.									6.25 *N4, K2*			
	Cleveland, Ohio	4.925 *R3, J3*	6.05 *R3, J3*		6.625 *R3*		7.275 *R3, J3*	8.975 *R3, J3*		6.15 *A5*			
	Detroit, Mich.	5.025 *G3, M2*	6.15 *G3* 6.05 *M2*				7.375 *G3*	9.075 *G3*					
	Newport, Ky	4.925 *A1*	6.05 *A1*										
	Gary, Ind. Harbor, Indiana	4.925 *U1, I3,Y1*	6.05 *U1, I3,Y1*	6.60 *U1, I3*	6.625 *U1, I3,Y1*	7.00 *U1*	7.275 *U1, Y1,I3*	8.975 *U1, Y1*		6.15 *Y1*	$10.05 *U1, Y1*	$8.75 *I3, U1,Y1*	7.50 *U1, Y1*
	Granite City, Ill.	5.125 *G2*	6.25 *G2*	6.80 *G2*	6.825 *G2*							$8.85 *G2*	7.60 *G2*
	Kokomo, Ind.			6.70 *C9*						6.25 *C9*			
	Mansfield, Ohio		6.05 *E2*			7.00 *E2*							
	Middletown, Ohio		6.05 *A7*	6.60 *A7*	6.625 *A7*	7.00 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	4.925 *R3, N3,S1*	6.05 *R3*	6.60 *R3*	6.625 *N3, S1*	7.00 *N3, S1,R3*	7.275 *R3*	8.975 *S1, R3*				$8.75 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa. Donora, Pa. Aliquippa, Pa.	4.925 *U1, J3,P6*	6.05 *U1, J3,P6*	6.60 *U1, J3*	6.625 *U1*		7.275 *U1, J3*	8.975 *U1, J3*	9.725 *U1*	6.15 *A5, J3,P6*	$10.05 *U1, J3*	$8.75 *U1, J3*	7.50 *U1, J3*
	Portsmouth, Ohio	4.925 *P7*	6.05 *P7*							6.15 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.925 *W3, W5*	6.05 *W3, F3,W5*	6.60 *W3, W5*		7.00 *W3, W5*	7.275 *W3*	8.975 *W3*			$10.05 *W5, W3*	$8.75 *W5, W3*	7.50 *W5*
	Youngstown, Ohio	4.925 *U1, Y1*	6.05 *Y1*		6.625 *Y1*		7.275 *Y1*	8.975 *Y1*		6.15 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.30 *K1*				8.175 *K1*	10.275 *K1*			$10.80 *K1*	$9.50 *K1*	
	Geneva, Utah	5.025 *C7*											
	Kansas City, Mo.									6.40 *S2*			
	Los Angeles, Torrance, Cal.									6.95 *B2*			
	Minnequa, Colo.									6.40 *C6*			
	San Francisco, Niles, Pittsburgh, Cal.	5.625 *C7*	7.00 *C7*	7.35 *C7*						6.95 *C7*	$10.80 *C7*	$9.50 *C7*	
	Seattle, Wash.												
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	4.925 *T2, R3*	6.05 *T2, R3*	6.60 *T2, R3*						6.15 *T2, R3*	$10.15 *T2*	$8.85 *T2*	
	Houston, Tex.									6.40 *S2*			

† Special coated mfg. terne deduct 50¢ from 1.25-lb. coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box.

* COKES: 1.50-lb. add 25¢.

ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb. 0.25 lb. add 65¢.

(Effective Dec. 9, 1957)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfrs. Bright
EAST	Bethlehem, Pa.				6.475 *B3*	8.775 *B3*	7.925 *B3*					
	Buffalo, N. Y.	5.425 *R3,B3*	5.425 *R3,B3*	7.35 *B3*	6.475 *B3,R3*	8.775 *B3,B5*	7.925 *B3*	5.10 *B3*		7.20 *B3*		7.65 *W6*
	Claymont, Del.							5.10 *C4*		7.20 *C4*	7.625 *C4*	
	Coatesville, Pa.							5.10 *L4*		7.20 *L4*	7.925 *L4*	
	Conshohocken, Pa.							5.20 *A2*	6.175 *A2*	7.20 *A2*	7.625 *A2*	
	Harrisburg, Pa.							5.80 *P2*	6.275 *P2*			
	Milton, Pa.	5.575 *M7*	5.575 *M7*									
	Hartford, Conn.			7.80 *R3*		9.075 *R3*	7.925 *B3*					
	Johnstown, Pa.	5.425 *B3*	5.425 *B3*		6.475 *B3*			5.10 *B3*		7.20 *B3*	7.625 *B3*	7.65 *B3*
	Fairless, Pa.	5.575 *U1*	5.575 *U1*		6.625 *U1*							
	Newark, N. J. Camden, N. J.			7.75 *W10* 7.75 *P10*		8.95 *W10* 8.95 *P10*						
	Bridgeport, Conn. Putnam, Conn. Willimantic, Conn.			7.85 *W10* 7.80 *J3*	6.55 *N8*	8.925 *N8*						
	Sparrows Pt., Md.		5.425 *B3*					5.10 *B3*		7.20 *B3*	7.625 *B3*	7.75 *B3*
	Palmer, Worcester, Readville, Mass. Mansfield, Mass.			7.85 *B5,C14*		9.075 *A5,B5*						7.95 *A5,W6*
	Spring City, Pa.			7.75 *K4*		8.95 *K4*						
MIDDLE WEST	Alton, Ill.	5.625 *L1*										7.85 *L1*
	Ashland, Newport, Ky.							5.10 *A7,A1*		7.20 *A1*		
	Canton, Massillon, Ohio			7.30 *R3,R2*	6.475 *R3,T5*	8.775 *R3,R2,T5*						
	Chicago, Joliet, Waukegan, Ill. Harvey, Ill.	5.425 *U1,R3,W8,N4,P13*	5.425 *U1,R3,N4,P13*	7.30 *A5,W10,W8,B3,L2,N9*	6.475 *U1,R3,W8*	8.775 *A5,W10,W8,L2,N8,B5*	7.925 *U1,W8*	5.10 *U1,A1,W8,I3*	6.175 *U1*	7.20 *U1,W8*	7.625 *U1,W8*	7.65 *A5,R3,W8,N4,K2,W7*
	Cleveland, Ohio	5.425 *R3*	5.425 *R3*	7.30 *A5,C13*		8.775 *A5,C13*	7.925 *R3*	5.20 *R3,J3*	6.175 *J3*		7.625 *R3,J3*	7.65 *A5,C13*
	Detroit, Mich.	5.525 *G3*	5.775 *G3*	7.30 *P3* 7.50 *P8,B5*	6.475 *R3* 6.575 *G3*	8.775 *R3* 8.975 *B5,P3,P8*	8.025 *G3*	5.20 *G3*		7.35 *G3*		
	Duluth, Minn.											7.65 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.425 *U1,I3,Y1*	5.425 *U1,I3,Y1*	7.30 *R3,J3*	6.475 *U1,I3,Y1*	8.775 *R3,M4*	7.925 *U1,Y1*	5.10 *U1,I3,Y1*	6.175 *J3,I3*	7.20 *U1,Y1*	7.625 *U1,Y1,I3*	7.75 *M4*
	Granite City, Ill.							5.30 *G2*				
	Kokomo, Ind											7.75 *C9*
	Sterling, Ill.	5.525 *N4*	5.525 *N4*					5.10 *N4*				7.75 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.30 *C10*	6.475 *C10,S1*	8.775 *C10*	7.925 *S1*	5.10 *R3,S1*		7.20 *S1*	7.625 *R3,S1*	
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.425 *U1,J3*	5.425 *U1,J3*	7.30 *A5,B4,R3,J3,C11,W10,S9,C8*	6.475 *U1,J3,C11,B7*	8.775 *A5,W10,R3,S9,C11,C8*	7.925 *U1,J3*	5.10 *U1,J3*	6.175 *U1*	7.20 *U1,J3,B7*	7.625 *U1,J3,B7*	7.65 *A5,J3,P6*
	Portsmouth, Ohio											7.65 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							5.10 *W3*				
	Youngstown, Ohio	5.425 *U1,R3,Y1*	5.425 *U1,R3,Y1*	7.30 *A5,Y1,F2*	6.475 *U1,Y1*	8.775 *Y1,F2*	7.925 *U1,Y1*	5.10 *U1,R3,Y1*		7.20 *Y1*	7.625 *U1,R3,Y1*	7.65 *Y1*
WEST	Emeryville, Cal. Fontana, Cal.	6.175 *J5* 6.125 *K1*	6.175 *J5* 6.125 *K1*		7.525 *K1*		8.625 *K1*	5.90 *K1*		8.00 *K1*	8.425 *K1*	
	Geneva, Utah							5.10 *C7*			7.625 *C7*	
	Kansas City, Mo.	5.675 *S2*	5.675 *S2*		6.725 *S2*		8.175 *S2*					7.90 *S2*
	Los Angeles, Torrance, Cal.	6.125 *C7,B2*	6.125 *C7,B2*	8.75 *R3,P14*	7.525 *B2*	10.65 *P14*	8.625 *B2*					8.60 *B2*
	Minnequa, Colo.	5.875 *C6*	5.875 *C6*					5.95 *C6*				7.90 *C6*
	Portland, Ore.	6.175 *O2*	6.175 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.125 *C7* 6.175 *B2*	6.125 *C7* 6.175 *B2*				8.675 *B2*					8.60 *C7 C6*
	Seattle Wash.	6.175 *B2,N6*	6.175 *B2*				8.675 *B2*	6.00 *B2*		8.10 *B2*	8.525 *B2*	
SOUTH	Atlanta, Ga.	5.625 *A8*	5.625 *A8*									7.85 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	5.425 *T2,R3,C16*	5.425 *T2,R3,C16,S11*	7.90 *C16*			7.925 *T2*	5.10 *T2,R3*			7.625 *T2*	7.65 *T2,R3*
	Houston, Ft. Worth, Lone Star, Tex.	5.675 *S2*	5.675 *S2*		6.725 *S2*		8.175 *S2*	5.20 *S2* 5.45 *L3*		7.30 *S2*	7.725 *S2*	7.90 *S2*

(Effective Dec. 9, 1957)

† Merchant Quality—Special Quality 35¢ higher

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Ames Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme Newport Steel Co., Newport, Ky.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Buffalo, N. Y.
B7 A. M. Byers, Pittsburgh

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 A. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C17 Chester Blast Furnace, Inc., Chester, Pa.

D1 Detroit Steel Corp., Detroit
D2 Dearborn Div., Sharon Steel Corp.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 J. & L. Steel Co., Stainless Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

STANDARD T. & C.	BUTTWELD ⅛ In. Blk.	⅛ In. Gal.	¼ In. Blk.	¼ In. Gal.	⅜ In. Blk.	⅜ In. Gal.	½ In. Blk.	½ In. Gal.	¾ In. Blk.	¾ In. Gal.	1 In. Blk.	1 In. Gal.	1¼ In. Blk.	1¼ In. Gal.	1½ In. Blk.	1½ In. Gal.	2 In. Blk.	2 In. Gal.	2½ - 3 In. Blk.	2½ - 3 In. Gal.	SEAMLESS 2 In. Blk.	2 In. Gal.	2½ In. Blk.	2½ In. Gal.	3 In. Blk.	3 In. Gal.	3½ - 4 In. Blk.	3½ - 4 In. Gal.
Sparrows Pt. *B5*	3.25	+12.0	6.25	+8.0	9.75	+3.50	12.25	+2.75	12.75	+1.75	13.25	+1.25	14.75	+1.50														
Youngstown *R3*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50														
Fontana *K1*	+8.25	+23.5	+5.25	+19.5	+1.75	+15.00	0.75	+14.25	1.25	+13.25	1.75	+12.75	3.25	+13.00														
Pittsburgh *J3*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	*9.25	+24.25	*2.75	+19.50	*0.25	+17.0	1.25	+15.50						
Alton, Ill. *L1*	3.25	+12.0	6.25	+8.0	9.75	+3.50	12.25	+2.75	12.75	+1.75	13.25	+1.25	14.75	+1.50														
Sharon *M3*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50														
Fairless *N2*	3.25	+12.0	6.25	+8.0	9.75	+3.50	12.25	+2.75	12.75	+1.75	13.25	+1.25	14.75	+1.50														
Pittsburgh *V1*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	*9.25	+24.25	*2.75	+19.50	*0.25	+17.0	1.25	+15.50						
Wheeling *W5*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50														
Wheatland *W4*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50														
Youngstown *Y1*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	*9.25	+24.25	*2.75	+19.50	*0.25	+17.0	1.25	+15.50						
Indiana Harbor *Y1*	4.25	+11.0	7.25	+7.0	10.75	+2.50	13.25	+1.75	13.25	+0.75	14.25	+0.25	15.75	+1.00														
Loram *N2*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	*9.25	+24.25	*2.75	+19.50	*0.25	+17.0	1.25	+15.50						
EXTRA STRONG PLAIN ENDS																												
Sparrows Pt. *B5*	7.75	+6.0	11.75	+2.0	14.75	2.50	15.25	1.25	15.75	2.25	16.25	2.75	16.75	1.50														
Youngstown *R3*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50														
Fairless *N2*	7.75	+6.0	11.75	+2.0	14.75	2.50	15.25	1.25	15.75	2.25	16.25	2.75	16.75	1.50														
Fontana *K1*	+3.75		0.25		3.25		3.75		4.25		4.75		5.25															
Pittsburgh *J3*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*7.75	+21.75	*0.25	+16.0	2.25	+13.50	7.25	+8.50						
Alton, Ill. *L1*	7.75	+6.0	11.75	+2.0	14.75	2.50	15.25	1.25	15.75	2.25	16.25	2.75	16.75	1.50														
Sharon *M3*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50														
Pittsburgh *V1*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*7.75	+21.75	*0.25	+16.0	2.25	+13.50	7.25	+8.50						
Wheeling *W5*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50														
Wheatland *W4*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50														
Youngstown *Y1*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*7.75	+21.75	*0.25	+16.0	2.25	+13.50	7.25	+8.50						
Indiana Harbor *Y1*	8.75	+5.0	12.75	+1.0	15.75	3.50	16.25	2.25	16.75	3.25	17.25	3.75	17.75	2.50														
Loram *N2*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*7.75	+21.75	*0.25	+16.0	2.25	+13.50	7.25	+8.50						

Threads only: buttweld and seamless 2½ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.

Galvanized discounts based on zinc price range of over 9c to 11c per lb. East St. Louis. For each 2c change in zinc, discounts vary as follows: ⅛, ¼ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1 pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13c to 15c would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7c to 9c would increase discounts. East St. Louis zinc price now 10c per lb.

(Effective Dec. 9, 1957)

To identify producers, see Key on preceding page

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.74	T-1
18	4	1	—	5	2.445	T-4
18	4	2	—	—	1.905	T-2
1.5	4	1.5	8	—	1.10	M-1
6	4	3	6	—	1.49	M-3
6	4	2	5	—	1.245	M-2
High-carbon chromium					.925	D-3, D-5
Oil hardened manganese					.475	O-2
Special carbon					.36	W-1
Extra carbon					.36	W-1
Regular carbon					.305	W-1

Warehouse prices on and east of Mississippi are 4c per lb higher. West of Mississippi, 6c higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

		Plate (*A3, J2, L4, C4*)			Sheet (*I2*)
	Cladding	10 pct	15 pct	20 pct	20 pct
Stainless Type	302				37.50
	304	37.95	42.25	46.70	40.00
	316	44.40	49.50	54.50	58.75
	321	40.05	44.60	49.30	47.25
	347	42.40	47.55	52.80	57.00
	405	29.85	33.35	36.85	
	410	29.55	33.10	36.70	
	430	29.80	33.55	37.25	

CR Strip (S9) Copper, 10 pct, 2 sides, 40.25; 1 side, 33.95.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.525	6.50	6.975				
Cleveland *R3*							14.75
So. Chicago *R3*				9.75			
Ensley *T2*	5.525	6.50					
Fairfield *T2*		6.50		9.75		6.60	
Gary *U1*	5.525					6.60	
Huntington *C16*		6.50					
Ind. Harbor *I3*	5.525		6.975	9.75		6.60	
Ind. Harbor *Y1*				9.75			
Johnstown *B3*		6.50					
Joliet *U1*			6.975				
Kansas City *S2*				9.75			14.75
Lackawanna *B3*	5.525	6.50	6.975			6.60	
Lebanon *B3*			6.975		14.50		14.75
Minnequa *C6*	5.525	7.00	6.975	9.75		6.60	14.75
Pittsburgh *P3*							14.75
Pittsburgh *J3*				9.75			
Seattle *B2*				10.25		6.75	15.75
Steelton *B3*	5.525		6.975			6.60	
Struthers *Y1*				9.75			
Torrance *C7*						6.75	
Williamsport *S5*		6.50					
Youngstown *R3*				9.75			

COKE

	Net-Ton
Furnace, beehive (f.o.b.) Connellsville, Pa.	$15.00 to $15.75
Foundry, beehive (f.o.b.)	$17.50 to $19.00
Foundry oven coke	
Buffalo, del'd	$31.75
Detroit, f.o.b.	30.50
New England, del'd	31.55
Kearney, N. J., f.o.b.	29.75
Philadelphia, f.o.b.	29.50
Swedeland, Pa., f.o.b.	29.50
Painesville, Ohio, f.o.b.	30.50
Erie, Pa., f.o.b.	30.50
Cleveland, del'd	32.65
Cincinnati, del'd	31.84
St. Paul, f.o.b.	29.75
St. Louis, f.o.b.	31.50
Birmingham, f.o.b.	28.85
Milwaukee, f.o.b.	30.50
Neville Is., Pa.	29.25

LAKE SUPERIOR ORES

51.50% Fe natural content, delivered lower Lake ports. Prices for 1957 season. Freight charges for seller's account. Gross Ton

Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

ELECTRICAL SHEETS

22-Gage	Hot-Rolled	Cold-Reduced Coiled or Cut Length	
F.o.b. Mill Cents Per Lb	Cut Lengths*	Semi-Processed	Fully Processed
Field		9.625	
Armature	11.10	10.85	11.35
Elect.	11.80	11.55	12.05
Special Motor		12.10	
Motor	12.90	12.65	13.15
Dynamo	13.95	13.70	14.20
Trans. 72	15.00	14.75	15.25
Trans. 65	15.55		
		Grain Oriented	
Trans. 58	16.05	Trans. 66	20.20
Trans. 52	17.10	Trans. 80	19.20
		Trans. 73	19.70

Producing points: Beech Bottom (*W5*); Brackenridge (*A5*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*N5*); Niles, O. (*N9*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville, Butler (*A7*).

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unbored.

GRAPHITE			CARBON*		
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price
24	84	26.00	40	100, 110	10.70
20	72	25.25	35	110	10.70
18	72	25.75	30	110	10.85
14	72	25.75	24	72 to 84	11.25
12	72	26.25	20	90	11.00
10	60	28.00	17	72	11.40
10	48	28.50	14	72	11.85
7	60	28.25	12	60	12.95
6	60	31.50	10	60	13.00
4	40	35.00	8	60	13.30
3	40	37.00			
2½	30	39.25			
2	24	60.75			

* Prices shown cover carbon nipples.

REFRACTORIES

Fire Clay Brick

Carloads per 1000

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00)	$135.00
No. 1 Ohio	120.00
Sec. Quality, Pa., Md., Ky., Mo., Ill.	120.00
No. 2 Ohio	103.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $2.00)	21.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$150.00
Childs, Hays, Pa.	155.00
Chicago District	160.00
Western Utah	175.00
California	180.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville	157.00-160.00
Silica cement, net ton, bulk, Latrobe	28.50
Silica cement, net ton, bulk, Chicago	25.50
Silica cement, net ton, bulk, Ensley, Ala.	26.50
Silica cement, net ton, bulk, Mt. Union	24.50
Silica cement, net ton, bulk, Utah and Calif.	37.00

Chrome Brick *Per net ton*

Standard chemically bonded, Balt.	$105.00
Standard chemically bonded, Curtiner, Calif.	115.00
Burned, Balt.	99.00

Magnesite Brick

Standard Baltimore	$131.00
Chemically bonded, Baltimore	116.00

Grain Magnesite St. ¾ to ½-in. grains

Domestic, f.o.b. Baltimore in bulk	$73.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	16.00
in sacks	52.00-54.00

Dead Burned Dolomite *Per net ton*

F.o.b. bulk, producing points in: Pa., W. Va., Ohio	$16.75
Midwest	17.00
Missouri Valley	15.00

(Effective Dec. 9, 1957)

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard Q Coated Nails Col	Woven Wire Fence Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Annld ¢ lb.	Merch. Wire Galv. ¢ lb.
Alabama City *R3*	173	187		212	193	8.65	9.20
Aliquippa *J3****	173	190			190	8.65	9.325
Atlanta *A8***	175	192		214	198	8.75	9.425
Bartonville *K2***	175	192	178	214	198	8.75	9.425**
Buffalo *W6*						8.65	8.95*
Chicago *N4****							
Cleveland *A6*							
Cleveland *A3*						8.65	
Crawf'dav. *M4****	175	192		214	198	8.75	9.425
Donora, Pa. *A5*	173	187		212	193	8.65	9.20
Duluth *A3*	173	187		212	193	8.65	9.20
Fairfield, Ala. *T2*	173	187		212	193	8.65	9.20
Galveston *D4*	9.10‡						
Houston *S2*	178	192		217	198	8.90	9.45
Jacksonville *M4*	184 ‡	197		219	203	9.00	9.675
Johnstown *B3***	173	190	172		196**	8.65	9.325**
Joliet, Ill. *A3*	173	187		212	193	8.65	9.20
Kokomo *C9**	175	189		214	195*	8.75	9.30*
L. Angeles *B2****						9.60	10.275
Kansas City *S2**	178	192		217	198*	8.90	9.45*
Minnequa *C6‡*	178	192	177	217	198‡	8.90	9.45‡
Monessen *P6*					193	8.65	9.20
Palmer, Mass. *W6*						8.95	9.50*
Pittsburg, Cal. *C7*	192	210			213	9.60	10.15
Rankin, Pa. *A3*	173	187			193	8.65	9.20
So. Chicago *R3*	173	187			193	8.65	9.20
S. San Fran. *C6‡*				236		9.60	10.15‡
SparrowsPt. *B3****	175			214	198	8.75	9.425
Struthers, O. *Y1**						8.65	9.30
Worcester *A3*	179					8.95	9.50
Williamsport *S5*							

* Zinc less than .10¢.
** 11-12¢ zinc.
*** 10¢ zinc.
† Plus zinc extras.
‡ Wholesalers only.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26 0.10	0.41 0.60	0.61 0.80	0.81 1.05	1.06- 1.35
Baltimore, Md. *T8*	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. *W12*		10.70	12.90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Cleveland *A3*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70		
Detroit *D1*	9.05	10.50	12.70	15.70	
Detroit *D2*	9.05	10.50	12.70		
Dover, O. *G4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	9.05	10.40	12.60		
Franklin Park, Ill. *T8*	9.05	10.25	12.45	15.45	18.40
Harrison, N. J. *C11*			12.90	16.10	19.30
Indianapolis *J3*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C7*	11.15	12.60	14.80	17.80	
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Pittsburgh *S7*	8.95	10.40	12.60	15.60	18.55
Riverdale, Ill. *A1*	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*		10.70	12.90	16.10	19.30
Wallingford *W1*	9.40	10.70	12.90	15.90	18.55
Warren, Ohio *T4*	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *J3*	8.95	10.40	12.60	15.60	18.55

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
Babcock & Wilcox	2	13	36.34	42.56	35.22
	2½	12	48.94	57.31	47.43
	3	12	56.51	66.18	54.77
	3½	11	65.97	77.25	63.93
	4	10	87.61	102.59	85.53
National Tube	2	13	36.34	42.56	35.22
	2½	12	48.94	57.31	47.43
	3	12	56.51	66.18	54.77
	3½	11	65.97	77.25	63.93
	4	10	87.61	102.59	85.53
Pittsburgh Steel	2	13	36.34	42.56	
	2½	12	48.94	57.31	
	3	12	56.51	66.18	
	3½	11	65.97	77.25	
	4	10	87.61	102.59	

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Pct. Discounts

Machine and Carriage Bolts	Full Container Price	30 Containers	20,000 Lb.	40,000 Lb.
½" and smaller x 6" and shorter	49	54	56	57
⅝" thru 1" x longer than 6"	35	40	43	45
Rolled thread carriage bolts ½" & smaller x 6" and shorter	49	54	56	57
Lag, all diam. x 6" & shorter	49	54	56	57
Lag, all diam. longer than 6 in.	39	44½	47	48½
Plow bolts, ½" and smaller x 6" and shorter	49	54	56	57

(Add 25 pct for broken case quantities)

Nuts, Hex, HP reg. & hvy.	Full case or Keg price
¼ in. or smaller	60½
⅝ in. to 1 in. inclusive	55½
1⅛ in. to 1½ in. inclusive	58½
1⅝ in. and larger	53½
C. P. Hex, reg. & hvy.	
¾ in. and smaller	60½
⅞ in. to 1½ in. inclusive	55½
1⅝ in. and larger	53½
Hot Galv. Hex Nuts (All Types)	
¾ in. and smaller	46½
Semi-finished Hex Nuts	
⅝ in. or smaller	60½
¾ in. to 1½ in. inclusive	55½
1⅝ in. and larger	53½

(Add 25 pct for broken case or keg quantities)

Finished

⅝ in. and smaller	63

Rivets

	Base per 100 lb
½ in. and larger	$12.25
	Pct. Off List
7/16 in. and smaller	19

Cap Screws

	Discount (Packages) Full Finished H. C. Heat Treat	
New std. hex head, packaged		
¼" diam. and smaller x 6" and shorter	40	26
¼", ⅜", and 7/16" diam. x 6" and shorter	22	3
½" diam. and smaller x longer than 6"	8	+13
½", ⅝", and 7/16" diam. x longer than 6"	+ 6	+32
	C-1018 Steel Full-Finished Cartons Bulk	
¼" through ⅝" dia. x 6" and shorter	58	49
¾" through 1" dia. x 6" and shorter	45	32

Minimum quantity ¼" through ⅜" diam., 15,000 pieces; 7/16" through ⅝" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.

Machine Screws & Stove Bolts

Plain Finish		Discount Mach. Screws	Discount Stove Bolts
Cartons		19	32
Bulk	*Quantity*		
To ¼" diam. incl.	25,000-200,000	9	54
5/16 to ½" diam. incl.	25,000-200,000	9	54
All diam. over 3" long	5,000-100,000	—	54

Machine Screws & Stove Bolt Nuts

	Discount Hex	Discount Square
In Cartons	16	19
In Bulk *Quantity*		
¼" diam & smaller	15,000-100,000	7	9

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.7
Chicago	140.9
San Francisco-L. A.	148.6

Dec. 1953 value, Class B or heavier 3 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper	
Rolled elliptical, 18 in. or longer, 5000 lb lots	43.50
Electrodeposited	33.25
Brass, 80-20, ball anodes, 2000 lb or more	44.00
Zinc, ball anodes, 2000 lb lots (for elliptical add 1¢ per lb)	16.50
Nickel, 99 pct plus, rolled carbon, 5000 lb	1.0225
(Rolled depolarized add 3¢ per lb)	
Cadmium	1.70
Tin, ball anodes and elliptical $1.13 per lb	

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	74.70
Copper sulphate, 100 lb bags, per cwt.	11.55
Nickel salts, single, 100 lb bags	32.50
Nickel chloride, freight allowed, 300 lb	48.50
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums (Philadelphia price 23.10)	23.05
Zinc cyanide, 100 lb	60.75
Potassium cyanide, 100 lb drum N. Y.	48.00
Chromic acid, flake type, 10,000 lb or more	31.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots for minus 100 mesh

Swedish sponge iron, del. East of Miss. River, ocean bags, 23,000 lb. and over	10.5¢
F.O.B. Riverton or Camden, New Jersey, freight allowed west of Miss. River	9.5¢
Domestic sponge iron, 98+% Fe, 23,000 lb. and over del'd East of Miss. River	10.5¢
F.O.B. Riverton, New Jersey, West of Miss. River	9.5¢
Canadian sponge iron, del'd in East, carloads	12.5¢
Electrolytic iron, annealed, imported 99.5+% Fe	27.5¢
domestic 99.5+% Fe	36.5¢
Electrolytic iron, unannealed minus 325 mesh, 99+% Fe	57.0¢
Electrolytic iron melting stock, 99.84% pure	27.0¢
Carbonyl iron size 3 to 20 micron, 98% 99.8+% Fe	88.0¢ to $2.85
Aluminum, freight allowed	38.00¢
Brass, 10 ton lots	31.1¢ to 47.1¢
Copper, electrolytic	41.50¢
Copper, reduced	40.3¢ to 48.8¢
Cadmium, 100-199 lb. 95¢ plus metal value	
Chromium, electrolytic, 99.85% min. Fe. 03 max. Del'd	$5.00
Lead	21.50¢ lb, f.o.b. plant
Manganese f.o.b. Extron, Pa.	46.0¢
Molybdenum, 99%	$3.60 to $3.95
Nickel, chemically precipitated	$1.05
Nickel, unannealed	$1.00
Nickel, annealed	$1.06
Nickel, spherical, unannealed 200	$1.13
Silicon	43.50¢
Solder powder	13¢ plus met. value
Stainless steel, 302	$1.02
Stainless steel, 316	$1.30
Tin	14.00¢ plus metal value
Tungsten, 99% (65 mesh)	$3.75 (nominal)
Zinc, 5000 lb & over	17.5¢ to 30.7¢

WARE-HOUSES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery; Charge	Sheets: Hot-Rolled (18 ga. & hvr.)	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)††	Strip: Hot-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled (merchant)	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Atlanta		8.59	9.87	10.13	8.64	8.97	9.05	9.01	10.68				
Baltimore	$.10	8.38	8.98	9.71	8.86	8.76	9.29	9.16	11.44*	16.18	15.18	19.73	18.98
Birmingham	.15	8.18	9.45	10.15	8.23	8.56	8.64	8.60	10.57				
Boston	.10	9.48	10.54	11.55	9.52	9.82	9.73	9.83	13.00	15.79	15.38	19.89	19.18
Buffalo	.15	8.40	9.15	11.22	8.65	9.05	9.05	8.95	11.05*	16.34	15.15	19.01	18.95
Chicago	.15	8.35	9.60	10.15	8.38	8.71	8.79	8.75	8.95	15.80	14.80	19.35	18.60
Cincinnati	.15	8.49	9.65	10.20	8.69	9.08	9.33	9.07	9.46	15.61	15.11	18.96	18.91
Cleveland	.15	8.33	9.60	10.10	8.48	8.94	9.16	8.84	10.95*	15.89	14.89	19.44	18.96
Denver	.20	9.70	11.30	12.49	9.80	9.70	9.80	9.98	10.65				17.60
Detroit	.15	8.58	9.85	10.50	8.73	9.06	9.33	9.05	9.30	15.46	15.06	18.81	18.86
Houston		8.45	9.75		8.60	9.05	8.60	8.55	11.10	16.20		19.30	19.05
Kansas City	.20	9.02	10.27	10.07	9.05	9.38	9.46	9.42	9.87	20.02	15.47	20.02	19.27
Los Angeles	.10	7.85**	10.85	11.75	7.90	7.90	7.95	7.90	13.35*	17.05	16.10	21.05	20.35
Memphis	.15	8.02	9.22		8.12	8.35	8.39	8.25	9.85				
Milwaukee	.15	8.48	9.73	10.28	8.51	8.84	9.00	8.88	9.18	15.43	14.93	18.78	18.73
New York	.10	8.97	10.23	10.66	9.41	9.53	9.45	9.67	12.86*	15.02	15.19	18.42	18.99
Norfolk	.20	8.00			8.40	8.35	8.70	8.45	10.70				
Philadelphia	.10	8.10	9.00	9.97	8.79	8.87	8.60	8.75	11.61*	15.61	15.11	18.96	18.91
Pittsburgh	.15	8.33	9.60	10.50	8.48	8.71	8.79	8.75	10.95*	15.80	14.80	19.35	18.60
Portland		8.50	11.20	11.55	9.05	8.30‡	8.65	8.65	14.50	18.50	16.10	20.75	20.25
San Francisco	.10	9.45	10.85	11.10	9.55	9.70	9.60	9.80	13.10	17.05	16.10	21.05	20.35
Seattle		9.95	11.15	12.00	10.00	9.70	9.80	10.80	14.05	16.55	16.35	20.65	20.15
Spokane	.15	10.10	11.30	12.15	10.15	9.85	9.95	10.25	14.20		17.35	21.55	21.05
St. Louis	.15	8.69	9.94	10.51	8.74	9.08	9.25	9.12	9.56	15.66	15.16	19.01	18.96
St. Paul	.15	8.94	10.19	10.76	8.99	9.45	9.53	9.37	9.81		15.26		19.06

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 1999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. ** All sizes except 18 and 16 gage. †† 10¢ zinc. ‡ Deduct for country delivery. † 3/16 in. to ½ in. • C1018—1 in. rounds

(Effective Dec. 9, 1957)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	
Birmingham *R3*	62.00	62.50*			
Birmingham *W9*	62.00	62.50*	66.50		
Birmingham *U4*	62.00	62.50*	66.50		
Buffalo *R3*	66.00	66.50	67.00	67.50	
Buffalo *H1*	66.00	66.50	67.00	67.50	
Buffalo *W6*	66.00	66.50	67.00	67.50	
Chester *P2*	66.50	67.00	67.50		
Chicago *I4*	66.00	66.50	66.50	67 00	
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Everett *M6*	67.50	68.00	68.50		
Fontana *K1*	75.00	75.50			
Geneva, Utah *C7*	66.00	66.50			
Granite City *G2*	67.90	68.40	68.90		
Hubbard *Y1*			66.50		
Ironton, Utah *C7*	66.00	66.50			
Midland *C11*	66.00				
Minnequa *C6*	68.00	68.50	69.00		
Monessen *P6*	66.00				
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*		66 50	67.00	67.50	
Sharpsville *S1*	66.00	66.50	66.50	67.00	
So. Chicago *R3*	66.00	66.50	66.50		
So. Chicago *W8*	66.00		66.50	67.00	
Swedeland *A2*	68.00	68.50	69.00	69.50	
Toledo *I4*	66.00	66.50	66 50	67.00	
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	74.00
Youngstown *Y1*			66.50	67.00	

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31 0.69 pct phos.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1*, *I4* (Globe Div.), $78.00, Niagara Falls (15.01 15.50), $101.00; Keokuk (14.01 14.50), $103.50; (15.51 16.00), $106.50. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 18 pct. Add $1.25 for each 0.50 pct manganese over 1.00 pct. Bessemer silvery pig iron (under .10 pct phos.): $64.00. Add $1.00 premium for all grades silvery to 18 pct.

† Intermediate low phos.

STAINLESS STEEL

Base price cents per lb f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.00	23.75	23.25	25.25	—	27.00	39.75	32.25	37.00	—	16.75	—	17.00
Slabs, billets	27.00	27.00	28.00	31.50	32.00	33.25	49.50	40.00	46.50	—	21.50	—	21.75
Billets, forging	—	36.50	37.25	38.00	41.00	40.50	62.25	47.09	55.75	32.00	28.25	28.75	28.75
Bars, struct.	42.00	43.00	44.25	45.00	48.00	47.75	73.00	55.50	64.75	37.75	33.75	34.25	34.25
Plates	44.25	45.00	46.25	47.25	50 00	50.75	76.75	59.75	69.75	40.25	35.00	36.75	36.00
Sheets	48.50	49.25	51.25	52.00	—	55.50	81.50	65.50	79.25	48.25	40.25	—	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	44.25	69.25	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	—	55.50	81.50	65.50	79.25	48.25	40.25	—	40.75
Wire CF; Rod HR	40.00	40.75	42.00	42.75	45.50	45.25	69.25	52.50 52.75	61.50	35.75	32.00	32.50	32.50

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; Vandergrift, Pa., *U1*; Washington, Pa., *W2*, *J2*, Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*.

Strip. Midland, Pa., *C11*; Waukegan, Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*, Washington, Pa., *W2*; W. Leechburg, Pa., *A3*; Bridgeville, Pa., *U2*; Detroit, *M2*; Canton-Massillon, O., *R3*; Harrison, N. J., *D3*; Youngstown, *J3*, Sharon, Pa., *S1*; Butler, Pa., *A7*; Wallingford, Conn., *U3* (plus further conversion extras); *W1*; New Bedford, Mass. (25¢ per lb higher), *R6*; Gary, *U1* (.25¢ per lb higher).

Bar: Baltimore, *A7*; S. Duquesne, Pa., *U1*, Munhall, Pa., *U1*, Reading, Pa., *C2*, Titusville, Pa., *U2*, Washington, Pa., *J2*; McKeesport, Pa., *U1*, *F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R5*, S. Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Canton, O., *T5*, *R3*; Ft. Wayne, *I4*; Detroit, *R5*; Gary, *U1*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Harrison, N. J., *D3*; Baltimore, *A7*; Dunkirk, *A3*; Monessen *P1*; Syracuse, *C11*; Bridgeville, *U2*.
Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse *C11*; S. Chicago, *U1*.

Plates: Brackenridge, Pa., *A3*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Middletown; *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*; Coatesville, Pa., *C15*; Vandergrift, Pa., *U1*; Gary, *U1*.

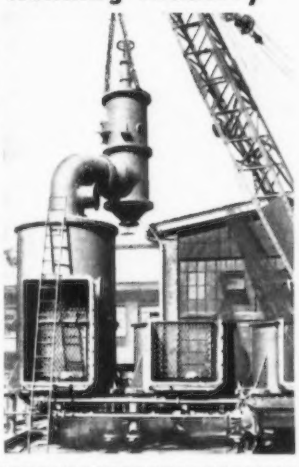
Forging billets: Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J2*; McKeesport, *F1*; Massillon, Canton, O., *R5*; Watervliet, *A3*; Pittsburgh, Chicago, *U1*, Syracuse, *C11*; Detroit, *R5*; Munhall, Pa., S. Chicago, *U1*.

(Effective Dec. 9, 1957)

KUTZTOWN *Skill*

creates EVAPORATORS *for the Sugar Refining Industry*

Partial assembly of a Lilly Type Multiple Effect Evaporator showing one section assembled with a large condenser to the piping. The tube plate within the shell, was machined and assembled at Kutztown.

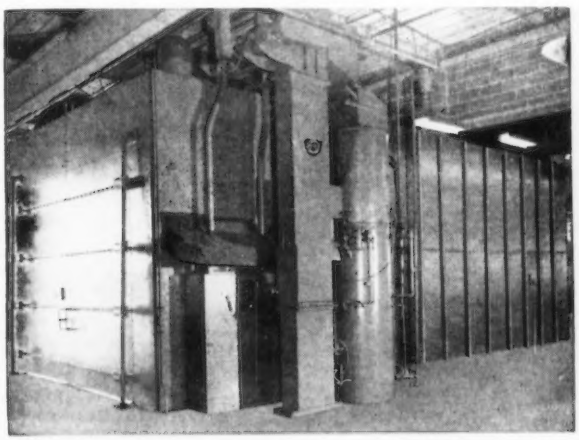


Here, as in other applications, the "old world" skills for which Kutztown Foundry is noted, were the bed rock from which satisfactory castings, as judged by long and excellent performance records, were produced.

Your inquiry is most welcome! No order is too large or too small for Kutztown to handle!

We'll be happy to place your name on our mailing list to receive regular issues of the "Kutztown REVIEW."

KUTZTOWN FOUNDRY & MACHINE CORP.
KUTZTOWN, PENNSYLVANIA



MACLEOD *Custom-Built*
BLAST CLEANING ROOMS

MACLEOD offers complete designing, fabrication, and installation of abrasive blast cleaning rooms, abrasive reclaiming systems, blast generators, and dust collecting systems — designed to meet your specific needs.

The room installation illustrated was built by MACLEOD and is served by a continuous automatic blast generator, abrasive reclaiming and cleaning system, and a dust collecting system with a 54,000 cu. ft. per minute capacity. Write for information on MACLEOD standard or specially designed equipment.

Our 60TH ANNIVERSARY YEAR
The MACLEOD Company
44 MOSTELLER RD., CINCINNATI 41, OHIO

FERROALLOY PRICES

Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, 50-1.00% max. Si.

0.02% C	41.00	0.50% C	38.00
0.05% C	39.00	1.00% C	37.75
0.10% C	38.50	1.50% C	37.50
0.20% C	38.25	2.00% C	37.25

4.00-4.50% C, 60-70% Cr, 1-2% Si.. 28.75
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 27.50
0.025% C (Simplex) 36.75
8.00% max C, 50-55% Cr, 3-6% max Si 25.00
8.50% max C, 50-55% Cr, 3% max Si 25.00

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule. Add 5¢ for each additional 0.25% of N.

Chromium Metal

Per lb chromium, contained, packed, delivered, ton lots, 97% min Cr, 1% max. Fe.

0.10% max. C	$1.31
0.50% max. C	1.31
9 to 11% C, 88-91% Cr, 0.75% Fe	1.40

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads	$1.29
Ton lots	1.31
Less ton lots	1.33

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-45%, C 0.05% max.) Carloads, delivered, lump, 3-in. x down, packed.

Price is sum of contained Cr and contained Si.

	Cr	Si
Carloads	27.50	14.20
Ton lots	32.75	15.65
Less ton lots	34.35	17.30

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 30-33% Ca, 60-65% Si, 3.00 max. Fe.

Carloads	25.65
Ton lots	27.95
Less ton lots	29.45

Calcium-Manganese—Silicon

Cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	24.25
Ton lots	26.15
Less ton lots	27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots	21.15
Less ton lots	22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5, 38-42% Cr, 17-19% Si, 8-11% Mn, packed

Carload lots	17.20
Ton lots	18.70
Less ton lots	19.95

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%

Carload packed	18.50
Ton lots to carload packed	19.65
Less ton lots	20.90

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O., Alloy, W. Va., Sheffield, Ala., Portland, Ore.	12.25
Johnstown, Pa.	12.25
Sheridan, Pa.	12.25
Philo, Ohio	12.25
S. Duquesne	12.25

Add or substract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	14.80
Ton lots packed	17.20

Spiegeleisen

Per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$100.50
19 to 21%	3% max.	102.50
21 to 23%	3% max.	105.00

Manganese Metal

2 in. x down, cents per pound of metal delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.75
Ton lots	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	34.00
Ton lots	36.00
250 to 1999 lb	38.00
Premium for Hydrogen - removed metal	0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn 25.50

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C	33.60	36.40	37.60
0.30% max. C	32.10	34.90	36.10
0.50% max. C	31.60	34.40	35.60
0.75% max. C, 80.85% Mn, 5.0-7.0% Si	28.60	31.40	32.60

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.

Carloads bulk	12.80
Ton lots, packed	14.45
Briquet contract basis carloads, bulk, delivered, per lb of briquet	15.10
Ton lots, packed, pallets	16.50

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots, packed	Carloads, packed
96.75% Si, 1.25% Fe	24.20	22.90
98% Si, 0.75% Fe	24.95	23.65

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.

Carloads, bulk	7.70
Ton lots, packed	10.50

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si	13.00	75% Si	16.40
65% Si	15.25	85% Si	18.10
	90% Si	19.50	

Ferrovanadium

50-55% V delivered, per pound, contained V, carloads, packed.

Openhearth	3.20
Crucible	3.30
High speed steel (Primos)	3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

(Effective Dec. 9, 1957)

Alsifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads	10.65¢
Ton lots	11.80¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.28

Ferrocolumbium, 50-50%, 2 in. x D, delivered per pound contained Cb.

Ton lots	$4.90
Less ton lots	4.95

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Sb plus Ta $4.25

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.68

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton $90.00
10 tons to less carload $110.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $240.00

Ferrotungsten, ¼ x down packed, per pounds contained W, ton lots delivered ..... $2.60 (nominal)

Molybdic oxide, briquets per lb contained Mo, f.o.b. Langeloth, Pa. $1.41
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.38

Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.

Carload, bulk lump	18.50¢
Ton lots, packed lump	20.50¢
Less ton lots	21.00¢

Vanadium oxide, 86-89% V_2O_5 per pound contained V_2O_5 .. $1.38

Zirconium, per lb of alloy

35-40% f.o.b. freight allowed, carloads, packed	27.25¢
12-15%, del'd lump, bulk-carloads	9.25¢

Boron Agents

Borosil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B
2000 lb carload $5.50

Bortram, f.o.b. Niagara Falls.

Ton lots per pound	45¢
Less ton lots, per pound	50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.
Ton lots per pound ..... 14.00¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots. $1.20
F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up

10 to 14% B	.85
14 to 19%	1.20
19% min. B	1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over

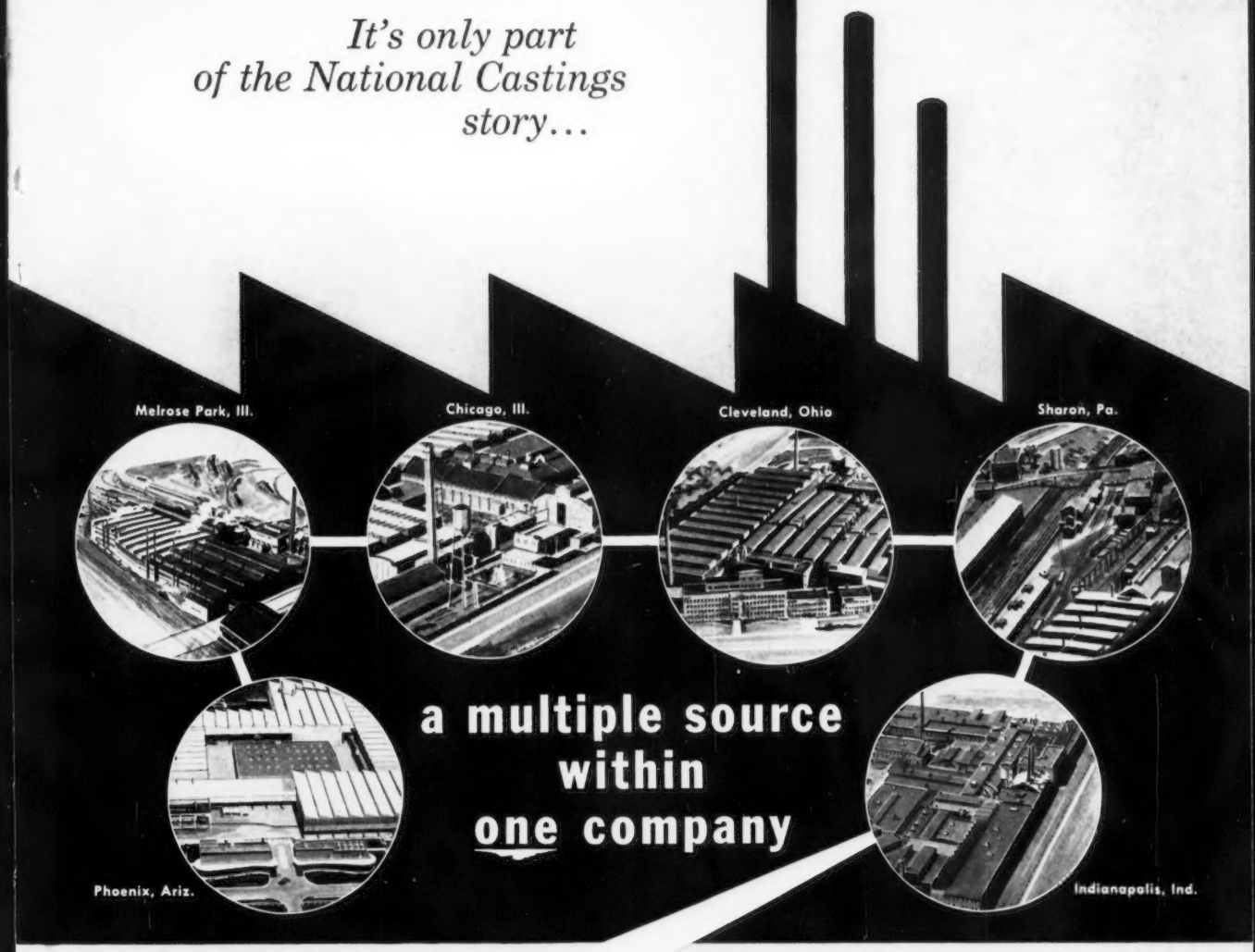
No. 1	$1.05
No. 79	50¢

Manganese-Boron, 75.00% Mn, 15.20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots	$1.46
Less ton lots	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max C, 3.00% max. Fe, balance Ni, del'd less ton lots 2.15

It's only part of the National Castings story...



Castings in—
malleable
HTM Metal
(pearlitic malleable)
carbon steel
alloy steel
*manganese steel**
*gray iron**

**Only from*
Capitol Foundry Division
Phoenix, Arizona

• Most companies—probably yours—pursue a "multiple source" policy to keep production lines humming. And with National you can continue this policy with several "plus" advantages.

• Individual jobs can be made interchangeable between plants . . . or equipment can be interchanged between plants. This way you get all the advantages of dealing with *one* strong company . . . with unparalleled facilities of *many* plants. Remember it's just part of the National story—flexibility of production with individual attention. AA-4637

NATIONAL MALLEABLE and STEEL **CASTINGS COMPANY**

Established 1868 • Cleveland 6, Ohio

RAILWAY EQUIPMENT FOR SALE

Used - As Is - Reconditioned

RAILWAY CARS

All Types

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For All Types of Cars

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Diesel-Electric

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STANDARD GAUGE CARS

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10—70-Ton Capacity

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"ANYTHING containing IRON or STEEL"

Rebuilders Put More Speed Into Cranes

Used machinery firm which specializes in crane rebuilding says inquiries are up but actual orders slow.

Most of their modernization aims at converting cranes into faster units with improved gearing and braking.

▪ Biggest trend in the rebuilding of cranes these days is modernizing controls and operating equipment to get speedier units.

That's the opinion of Ohio Crane and Engineering Co. which specializes in the used crane business. The firm reports that inquiries on crane rebuilding jobs from heavy steel and industrial concerns are currently swamping them. However, when it comes to actual buying the customers are moving mighty slowly.

Accent on Speed — Any trend toward increasing crane capacity by beefing the units up seems to be tapering off, according to Ohio's general manager Virl Berry. Most modernizing jobs, he says, include speeding the units up, converting from direct current to alternating current, installing dynamic braking rather than mechanical and replacing gears.

Most purchasing of used cranes seems to be handled largely by engineering departments rather than by purchasing departments. Orders, of course, are still channeled through purchasing and it is consulted through the negotiations.

Custom Tailored Jobs—On larger units, an exchange is generally worked out by Ohio Crane. The existing plant crane is first checked over and specified characteristics for the new one worked out. Then a crane in Ohio Crane's warehouse is re-built to the new specs with new motors, controls, accessories and other features.

Through this method, shop downtime for lack of a crane is kept to a minimum. Also work on the replacement can be done in Ohio Crane's own shop and expense of sending out a dismantling crew is eliminated. The replacement is shipped out in knocked down condition and erected on the job site, sometimes in 24 hours.

Cost Picture—The old crane is, in effect, traded in on a new one although trade-in value is not too large. Sometimes only $25 per ton of weight. On a typical 60 ft span crane with 15-ton lifting capacity, price of the replacement, including trade-in allowance, is between $22,000 and $25,000, depending on specifications. Accessories can boost the price materially.

The installed price still comes to only about 55-75 pct of an equivalent new crane.

The limiting factor on delivery, according to Berry is availability of the electrical equipment. Special motors used for steel mills require 16-18 weeks to obtain with an additional week for wiring and installation. Controls take even longer. Generally the controls are promised in 14 weeks and end up requiring 18 weeks, Berry states.

Big Selection—Ohio Crane maintains about 75 used cranes at its Cleveland headquarters. Some are obtained as trade-ins, while others are bought right for stock.

CONSIDER GOOD USED EQUIPMENT FIRST

AIR COMPRESSORS
450 cu. ft. Ingersoll Rand XRE 8" x 8" & 3½" x 8" 100 lb. Pressures, 100 H. P. A. C. Syn. Motor
2700 cu. ft. Ingersoll Rand PRE2, 30" x 18" x 21" 100 lb. Pressures, 500 H.P. Syn. Motor

BENDING ROLLS
10' x 10" Ga. Bertsch Initial Type
10' x ½" King Pyramid Type
16' x ⅜" Ransome Pyramid Type
18' x 1" Niles Pyramid Type

BRAKE—PRESS TYPE
12' x ½" Cincinnati

CRANES—OVERHEAD ELECTRIC TRAVELING

3 ton P&H	56' Span 220/3/60
5 ton Cleveland	60' Span 115 Volt D.C.
5 ton Shepard Niles	70' Span 230 Volt D.C.
8 ton P&H	55' Span 220/3/60
10 ton Shepard Niles	38' Span 440/3/60
10 ton Shaw	48' Span 230 Volt D.C.
10 ton Shaw	120' Span 230 Volt D.C.
15 ton Shepard Niles	52' Span 230 Volt D.C.
15 ton Niles	75' Span 230/3/60
20 ton Shaw	28' Span 230 Volt D.C.
120 ton Shepard Niles	77' Span 220/3/60

FORGING MACHINES
1" to 5" Acme, Aiax, National

FURNACE—MELTING
15 ton Heroult Top Charge, 12' Shell Complete with Transformers

HAMMERS—BOARD DROP—STEAM DROP—STEAM FORGING
800 lb. to 20,000 lb. incl.

HEADERS
#2500 Manville Solid Die Single Stroke
#44 Waterbury Farrel DSOD Cap. ⅝" x 6"

LEVELLERS—ROLLER
18" Torrington, 15 Rolls 2⅝" dia.
37" Torrington, 19 Rolls 1 31/32", dia.
42" Bliss, Nine Rolls 4½" dia.
66" Aetna 17 Rolls 4⅝" dia.

PLANER
72" x 72" x 16' Detrick & Harvey Four Head

PRESSES—HYDRAULIC
250 ton AEAco Straightening 4-Column, 16" Stroke, 42" x 35" Between Columns, 16' Long Bed
500 ton HPM Fastraverse, Bed 36" x 36"
1500 ton Bliss 15" Stroke, Bed 49" x 48"
1500 ton Mesta Steam Hydr. Forging Press
2000 ton Bliss 18" Stroke Bed Area 54" x 55"
4,000 Baldwin-Lima-Hamilton Hydr. Forging Press

PRESSES—STRAIGHT SIDE
180 ton Hamilton #347, 12" Str. 85½" Bet. Ups
200 ton Clearing P1200-42, Stroke 30", Bed 44"x58"
250 ton Bliss #88 12" Str. Bed 29" x 29"
250 ton Bliss S1 7½" Str. Bed 33" x 39"

PRESSES—KNUCKLE JOINT
600 ton Clearing K-1600-36, 4" stroke, Bed 36"x36"
1500 ton Verson, 4" Stroke, Bed 18" x 18"

PUNCH & SHEAR COMBINATIONS
Cleveland Style EF, Arch Jaw 4 cap. 1¼" x 1"
Cleveland Style G, Single End, 60" Throat
Cleveland Style W, 60" Throat, Architectural Jaw
#7 Kling, 72" Throat, With Thomas Duplicator

ROLLING MILLS
6" x 5" Torrington Wire Flattening Mill Line
8" x 10" Schmitz Single Stand Two High
10" x 14" Single Stand Two High
10" x 16" Single Stand Two High
12" x 12" Single Stand Two High
12" x 16" Single Stand Two High
16" x 24" Single Stand Two High
20" x 36" Single Stand Two High

ROLLS—PLATE STRAIGHTENING
108" Bertsch, Seven Rolls 9" Dia.
72" Niles, 7 Rolls 9" Dia. Motor Driven

SHEAR—ALLIGATOR
No. 4 Mesta RH LN, Capacity 2" x 12"

SHEARS—GATE
6' x 1" Hilles & Jones #6
12' x ¾" Niagara Model 1212, NEW 1951

SHEAR LINES
56" x .020 Ga. Hallden Shear Line
48" x ⅜" Heavy Duty Shear Line
60 x 7 Ga. Shear Line
96" x 14 Ga. Cleveland Shear Line

SHEARS—SQUARING
6' x 10 Ga. Niagara No. 672
10' x ¾" Cincinnati #1810
10' x ⅝" Cincinnati #2510

SHEAR—ANGLE
6" x 6" x ⅝" Hilles & Jones

SLITTER
16" Payon Slitting Line

STRAIGHTENERS
No. 3 Medart 3 Roll, Capacity to 4½" Tubing
12 Roll Aetna Standard, Capacity 2⅜ O.D.
No. OA Medart 2 Roll, Capacity ⅜" to 1" Bars
No. O Medart 2 rolls, Capacity to 1¼" dia. Bars

SWAGING MACHINE
#6½ A Fenn, Capacity 3⅜" Tube, 1¼" Solid, 16" Die Length Hydraulic Feed, LATE

WIRE MACHINERY
New England Butt Co. 4-Bobbin Planetary cablers Model X-30A, Robbin Size 16" x 19½"
Vaughn Wire Drawing Machine 4 Blocks 22" Dia. Complete elect. equip. for each block

ROLLS—FORMING
14 stand Yoder, 2½" shaft dia., 30" bet. housings

TESTING MACHINES
100,000 lbs. Olsen Universal
20,000 Olsen Universal
50,000 Olsen Plastiversal

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SLIP RING MOTORS
Constant Duty—3 phase, 60 cycle

Qu.	H.P.	Make	Type	Volts	R.P.M.
2	2500	Whse.	CW	4600/2300	720
1	2500	G.E.	Mill	2300	240
1	1800	Whse.	Mill	6600/4000	270
2	1800	Whse.	Mill	2200	252
2	500	Al. Ch.	ARY	2300	505
1	500	G.E.	I-M	2300	450
1	400	Al. Ch.	ARY	2200	505
1	400	Whse.	CW	2200	290
1	350	G.E.	I-M-15B	2200	1180
1	[illegible]	G.E.	MT-412	2200	450
1	300	Whse.	CW 1012	2200	720
1	250	Al. Ch.	ARY	440	705
1	250	G.E.	MT-414	2200	300
1	200	G.E.	I-M	2200	1760
2	200	G.E.	I-17-M	2200	585
1	200	G.E.	I-14-M	2200	490
1	150	Al. Ch.	ARY	440/220	720
1	150	Whse.	CW	4160/2300	585
1	150	Whse.	CW-1000	440	435
1	100	Whse.	CW	440/220	1160
1	100	El. Dy.	EDX612	2300	900
2	100	G.E.	MT-562	440/220	570
2	100	G.E.	I-15A-M	2300	495
1	100	Al. Ch.	ARY	440	430

SYNCHRONOUS MOTORS
3 Phase, 60 Cycle

Qu.	H.P.	Make	P.F.	Volts	R.P.M.
1	1750	G.E.	100	2200	3600
1	1500	G.E.	80	2400/4160	900
1	1500	Whse.	80	2300	514
1	920	G.E.	80	2200/440	300
1	710	G.E.	80	2300	720
1	450	Whse.	100	2200	128.5
3	350	G.E.	100	2300	900
1	300	G.E.	100	2300	720
1	300	G.E.	80	2200	600
2	300	G.E.	80	440	400
2	250	Whse.	80	440	600
1	200	Al. Ch.	100	2230	514
1	200	Al. Ch.	100	2300	360
1	150	G.E.	100	2200	900
1	150	El. Mchy.	80	220	720
1	150	G.E.	100	550	600
3	135	G.E.	80	4000/2200	1200
1	125	G.E.	80	2200	900
2	100	Whse.	80	440/220	1800
1	100	Ideal	80	440/220	900
2	100	G.E.	80	440/220	600
1	100	El. Mchy.	100	440/220	360
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1	2250	Elliott		600	200/300
1	2200	G.E.	MCF	600	400/500
1	1750	Elliott		250	175/350
1	1375	G.E.	MCF	415	1300
1	1200	G.E.	MCF	600	450/600
1	940	Whse.	QM	250	140/170
3	800	G.E.	MCF	250	400/750
3	450	Whse.		550	415
2	300	G.E.	MPC	230	400
2	200	Whse.	CB-207.4	250	850/1200
2	125	Whse.	SK-190	230	450/1200
1	150	G.E.	CDBB	600	250/700
1	150	Cr. Wh.	45-H	230	1150
1	125	Whse.	SK-185	230	350/1050
2	100	Whse.	SK-181	230	450/1000
1	60/100	G.E.	RF-17	230	450/900
1	75	G.E.	CD-1231	230	850
2	75	Cr. Wh.	58HTEFC	230	860
1	50	G.E.	MD-412-AE	230	550
6	40	Rel.BB	385FTEFC	230	500/1500
1	30/40	Whse.D.P.	SK-131.5-BB	230	500/1500
8 (unused)	30	G.E.	CDM-85-BB	230	2200

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Qu.	K.W.	Make	RPM	DC Volts	AC Volts
1	350	G.E.	900	125	4160/2300/440
1	2000	G.E.	514	600	2300/4600
2	1750/2100	G.E.	514	250/300	2300/4600
3	1000	G.E.	720	600	6600/13200
1	750	G.E.	720	125/250	2300/4000
1	500	Whse.	900	125/250	440
1	500	G.E.	900	125/250	440/2300
3	300	G.E.	1200	250	2300
1	250	Whse.	1200	275	2300
1	200	El. Ma.	1200	250	2300/4600
1	200	Whse.	1200	550	2300
1	200	G.E.	1200	250	440

TRANSFORMERS

Qu.	KVA	Make	Type	Ph.	Voltages
3	3333	Whse.	OISC	1	13800 x 2300
1	1500	G.E. auto	HT	3	4000/4200/4400
3	1000	G.E.	HVDDJ	1	2400 x 480
3	1000	G.E.	OA/FA	1	13800 x 230/460
2	750	G.E.	Pyranol	1	4800 x R3/55
3	500	Kuhl	OISC	1	13200 x 6600
3	500	Moloney	OISC	1	6600/11430Y x 2300/4000Y
1	225	Marcus	Auto-air	3	208/220
Unused					
3	150	G.E.		1	33000 x 2300/4000Y
3	100	Whse.	OISC	1	4600/2300 x 460/230/115
3	100	G.E.	OISC	1	22900 x 2400/4160Y
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150	Al.-Ch.	ANY	600
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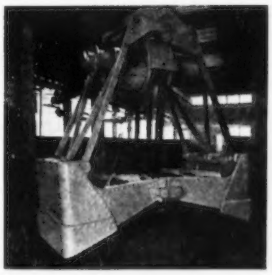

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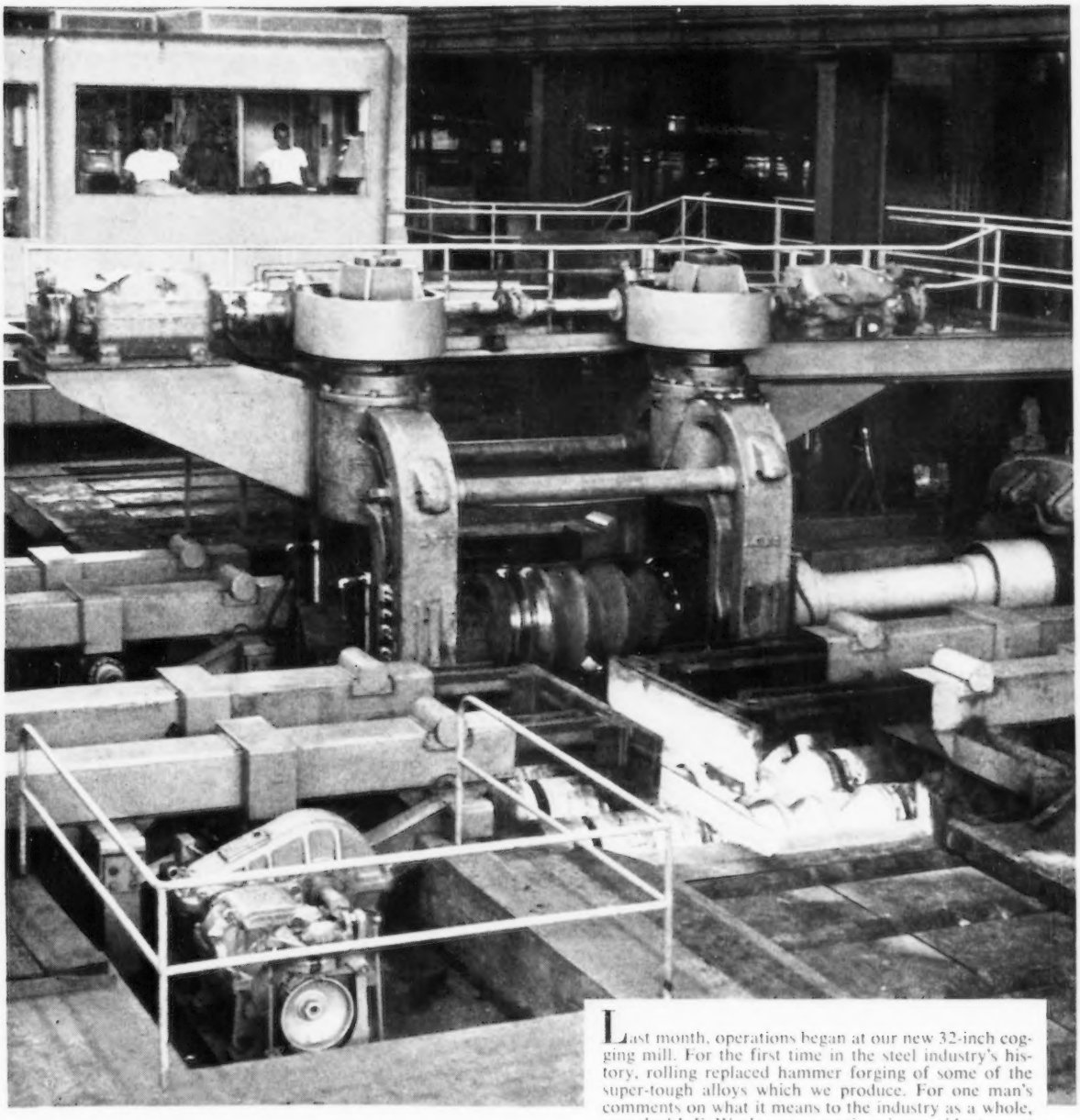


"...could lead to significant industry increases..."

Last month, operations began at our new 32-inch cogging mill. For the first time in the steel industry's history, rolling replaced hammer forging of some of the super-tough alloys which we produce. For one man's comments on what it means to the industry as a whole, we asked J. F. Workman, executive vice president, to set down his thoughts.

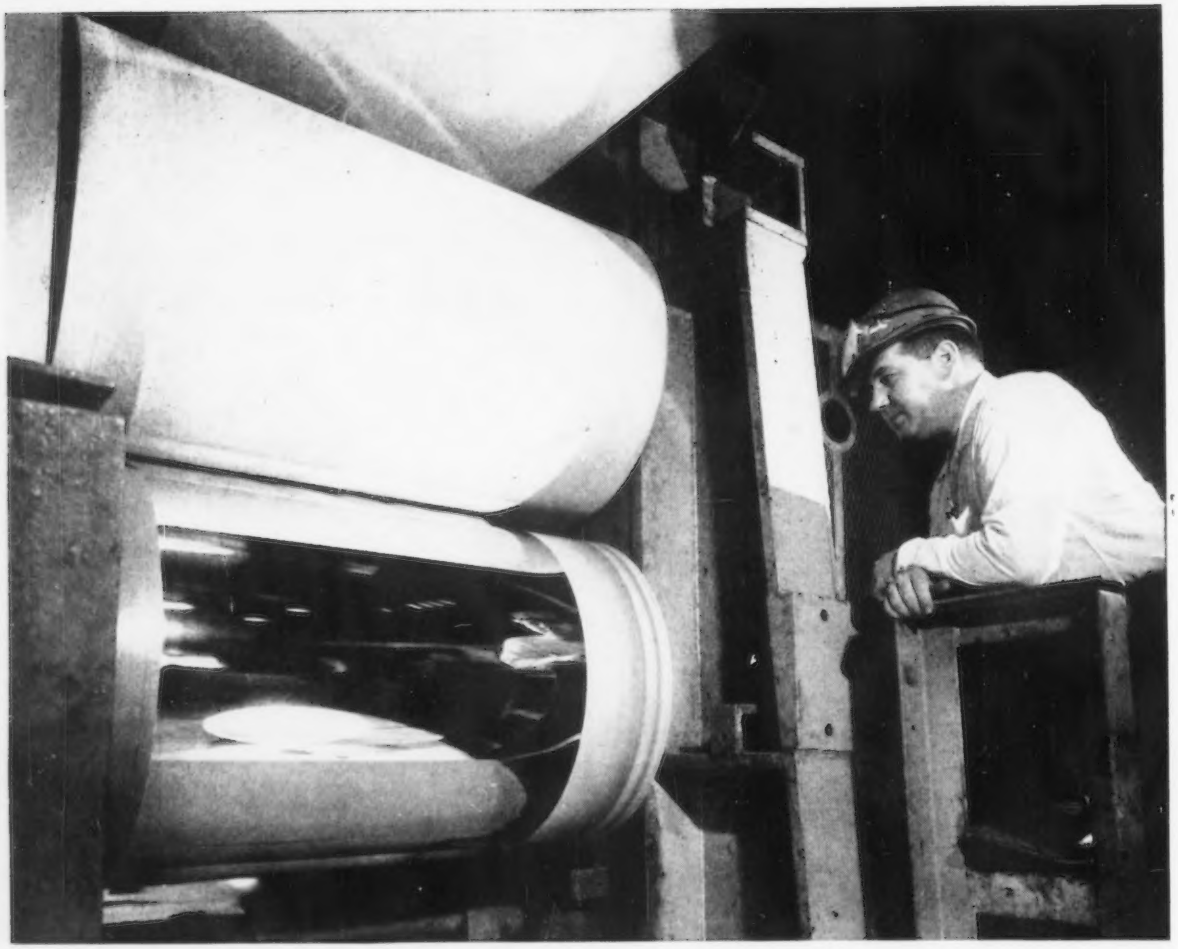
"Naturally," says Mr. Workman, "we're proud of this accomplishment. But more important than that, we feel it could lead to significant industry increases in the production of vital highspeed and superalloy steels. For what we have learned can conceivably be used by many other companies.

"Just as important, for our customers and friends, is this point: the new mill reflects the everyday effort of this company to produce a better, more predictable product. There are other results of our research and development which don't make the headlines – but all make for better service and better products."

We're preparing a little booklet which tells more about the new mill. If you'd like to receive a copy of it when ready, please write us. Address Department A.

LATROBE STEEL COMPANY LATROBE STEEL COMPANY **LATROBE, PA.**

B.F.Goodrich report:



Rubber stays dull to keep tin plate shiny

B. F. Goodrich improvements in rubber brought extra savings

Problem: Those are tension bridle rolls on a high-speed electrolytic tin plating line. Their job is to keep a continuous strip of steel moving through the line under controlled tension so that it neither buckles nor stretches too tight.

But for years, these rubber-covered rolls were a terrific headache in steel mills. After just a few hours, the rubber was polished smooth and shiny with rubbing plus high speed. Then the rolls couldn't grip, the steel smeared and couldn't be used for tin cans.

What was done: B.F.Goodrich engineers worked on the problem, and came up with a new, improved rubber compound. Rolls covered with this special rubber don't glaze, don't slip, don't mar the finish of the plate.

Savings: At the mill shown above, B.F.Goodrich Strip-Grip rolls last 100 per cent longer than the rolls previously used. The appearance of the tin plate has been consistently good.

Extra benefits: Maintenance costs have gone way down, too. That's because the roll cover keeps its dull finish permanently. Strip-Grip rolls have operated for periods of three or four months without maintenance of any kind, in mills where conventional rolls needed almost daily attention.

Where to buy: B.F.Goodrich distributors have full information on the steel mill rolls described here. And, as factory-trained specialists in rubber products, they *can* answer your questions about *all* the products B.F.Goodrich makes for industry. *B.F.Goodrich Industrial Products Co., Dept. M-241, Akron 18, Ohio.*

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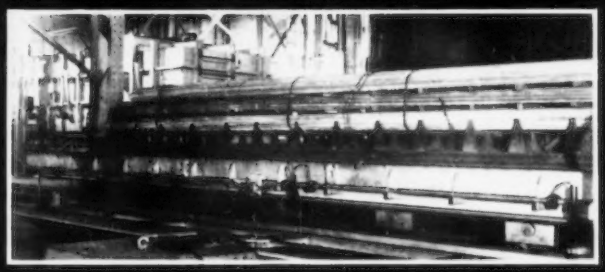


A thirty-foot straight bar furnace in operation at Youngstown Sheet and Tube's Briar Hill Plant.

Lee Wilson Merchant Bar Annealing System

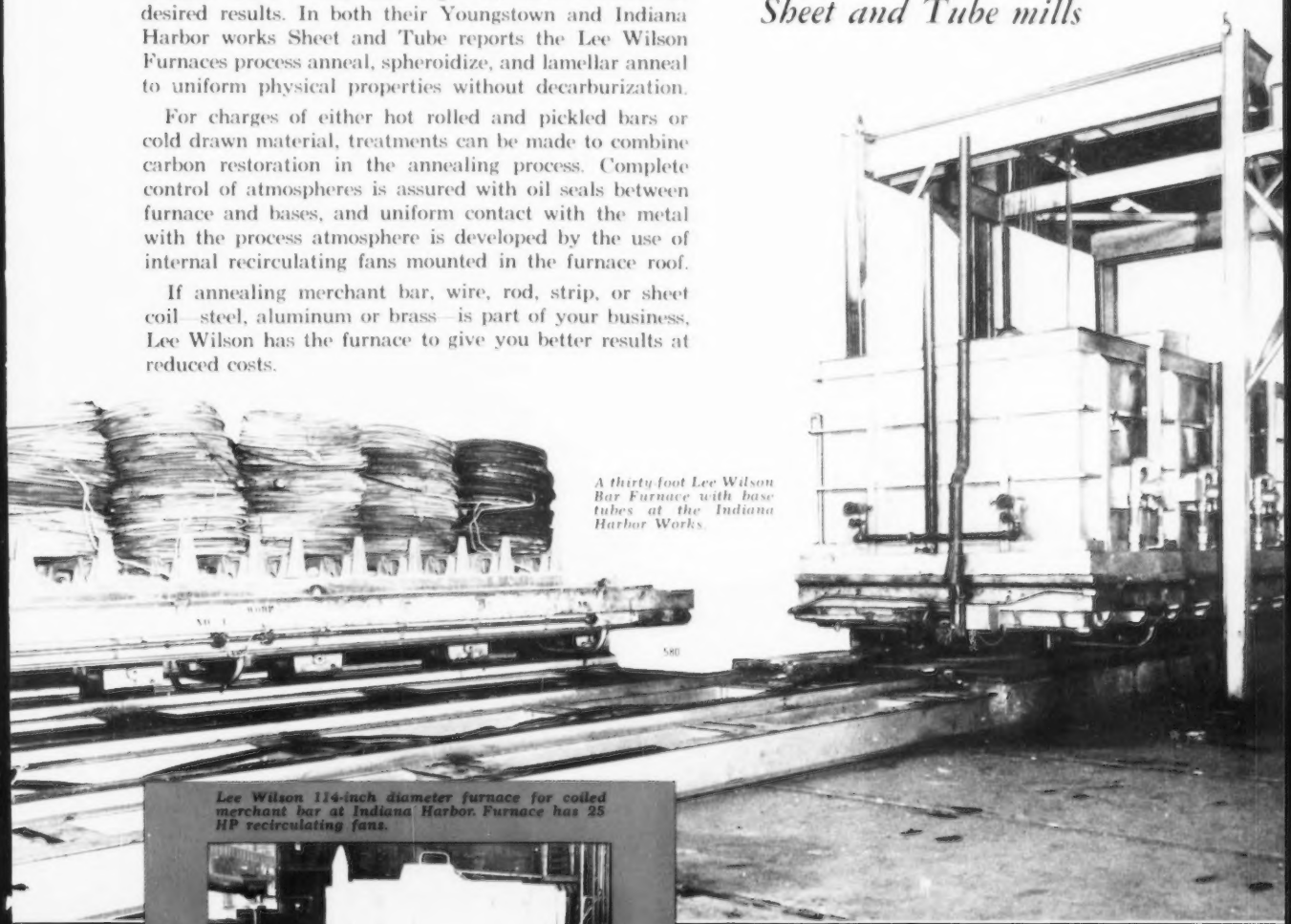
improves properties, finish...reduces costs

FOR annealing merchant bar in coils and long straight lengths Youngstown Sheet and Tube found Lee Wilson Radiant Tube Fired, Gas Tight Furnaces deliver the desired results. In both their Youngstown and Indiana Harbor works Sheet and Tube reports the Lee Wilson Furnaces process anneal, spheroidize, and lamellar anneal to uniform physical properties without decarburization.

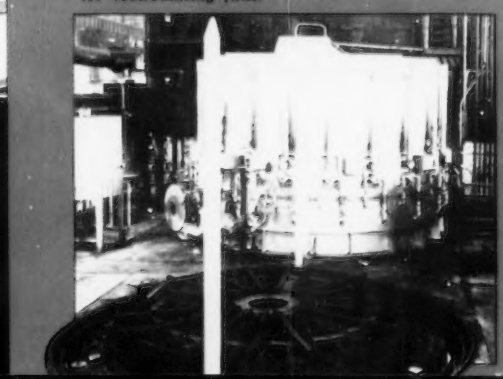
For charges of either hot rolled and pickled bars or cold drawn material, treatments can be made to combine carbon restoration in the annealing process. Complete control of atmospheres is assured with oil seals between furnace and bases, and uniform contact with the metal with the process atmosphere is developed by the use of internal recirculating fans mounted in the furnace roof.

If annealing merchant bar, wire, rod, strip, or sheet coil—steel, aluminum or brass—is part of your business, Lee Wilson has the furnace to give you better results at reduced costs.

... at two Youngstown Sheet and Tube mills



A thirty-foot Lee Wilson Bar Furnace with base tubes at the Indiana Harbor Works.



Lee Wilson 114-inch diameter furnace for coiled merchant bar at Indiana Harbor. Furnace has 25 HP recirculating fans.

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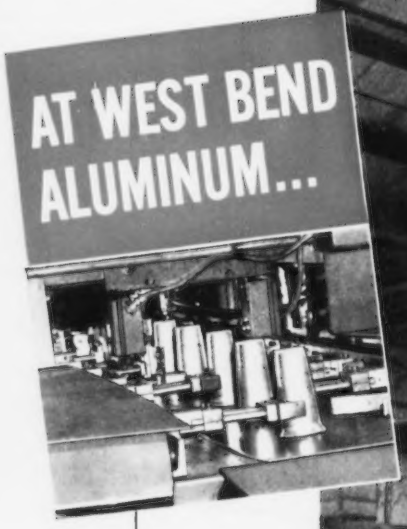

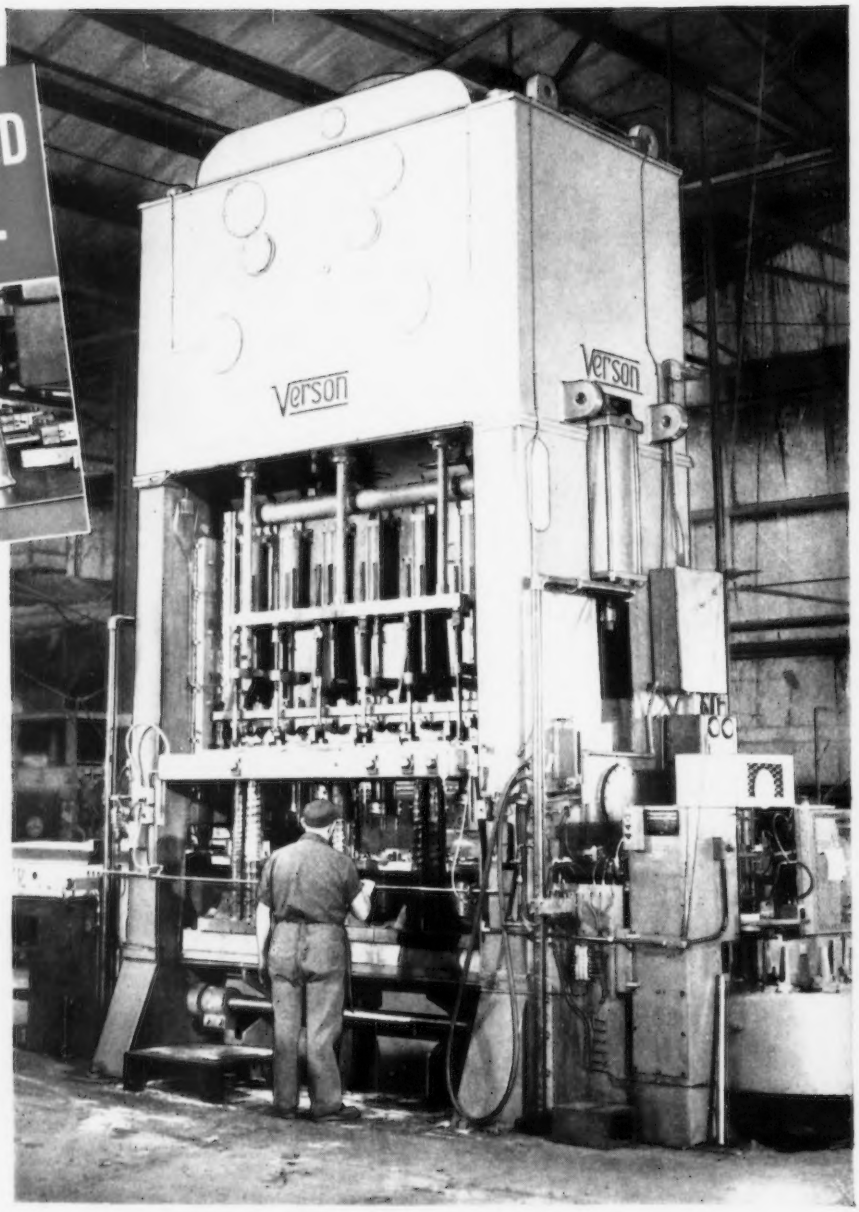

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